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# USSR Report

AGRICULTURE

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# USSR REPORT

## AGRICULTURE

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## POST HARVEST CROP PROCESSING

### CHANGES RECOMMENDED TO CORRECT FOOD PRODUCTION DEFICIENCIES

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 12, Dec 85 pp 90-94

[Article by A. Yaitskikh, deputy director of USSR VASKhNIL [All-Union Agricultural Academy imeni V. I. Lenin] department and by Ye. Kazakov, senior scientific worker of NIEI [Scientific-Research Institute of Economics] of USSR Gosplan]: "Possibilities for Changing the Structure of Nutrition and the Production of Food Products"]

[Text] As far as caloric content is concerned, the food ration of the Soviet people corresponds to the physiological norm and surpasses it to a certain degree. Further improvements in nutrition are related to a more complete satisfaction of man's need for animal protein and to achieving the optimal ratio between products which utilize all food substances in balanced form. For this the country's Food Program indicates a forestalling development of vegetable and fruit, vegetable oil, and meat and meat product production, and a more complete satisfaction of consumer demand for groats, confectionary items, margarine and fruit and canned vegetables. The branches of the agroindustrial complex (APK) are allocated significant capital investments and material resources to carry out this goal.

In accordance with the tasks established by the country's Food Program, we must deal with the problem of stable production of agricultural products and guaranteed harvests regardless of the fluctuations in weather conditions, which in the course of 4 years of the 11th Five-Year Plan had a negative effect on the fulfillment of plan goals. We must also achieve a considerable abatement of seasonality in the production and consumption of many food products. Simultaneously, we must constantly decrease expenditures of public labor for the production of food, economize on material and manpower resources and more effectively utilize fixed production capital and capital investments.

Our research shows that there are considerable reserves for intensifying the economy of the country's food complex. There is a significant underproduction of ready end products due to inadequate unification of technological processes among the links of the complex. In the sugar beet subcomplex only 65 percent of the sugar available initially in cultivated sugar beets is utilized. In the dairy products subcomplex about 50 percent of milk protein is not utilized for food purposes. The level of processing of fruits and vegetables in the canning industry is low. Due to the lack of balance in the feed ration daily

weight gain in cattle and hogs is lower than the potential productivity of a breed. For this reason the fattening schedule exceeds normative levels by a factor of 2 or more; expenditures for the production of livestock products are becoming excessively great. Curtailing these expenditures will enable us to increase the volume of food products.

One of the ways to significantly accelerate the pace of growth of food items with the simultaneous freeing of production resources for the achievement of other social goals of public development involves improving the structure of the food ration and the use of agricultural raw materials for food purposes. Already at present the necessity has arisen to change the caloric content of the food ration, which is 15-20 percent greater than the physiological norms for nutrition due to excessive consumption of potatoes, bread, bread and roll items, sugar, items made from sugar and so on. Thus, average per capita sugar consumption in the USSR has reached 44-45 kilograms per year whereas the norm calls for no more than 18-37 kilograms.

Right now the structure of nutrition is being altered. In connection with the country's Food Program, the output of meat and meat products, milk and milk products and fresh vegetables and fruits is increasing. Growth in the production of high-quality natural juices, syrups and other non-alcoholic drinks with a grape and fruit base is planned.

In some enterprises of the alcohol industry the output of alcohol is decreasing and the output of starch for the needs of the confectionary and bread-baking industries is increasing. At the same time, it is expedient to further improve the ratio between carbohydrate and fat components of nutrition. A decrease in the excessive consumption of sugar must to a significant degree be compensated for by increasing the level of consumption of fat, especially of vegetable oil.

As long ago as 1980, the Nutrition Laboratory of the USSR AMN [Academy of Medical Sciences] recommended decreasing the level of sugar consumption by 20 percent and bringing it down to an efficient norm after that. The annual per capita fat requirement comprises 38 kilograms. Actual fat consumption has not yet reached the recommended level. This is why it is expedient to use resources freed from the sugar-beet subcomplex to increase the production of vegetable oils. The high economic effectiveness of this maneuver is confirmed by the following calculations. The caloric content of 1 kilogram of sugar is lower by a factor of 2.3 than that of 1 kilogram of vegetable oil, whereas total expenditures for oil production exceed expenditures for sugar production by only 20 percent.

Estimates show that as a result of the introduction of industrial technologies for cultivating sugar beets, which result in increased productivity and increased sugar content in root crops, and of decreasing significant losses of raw materials during harvesting, shipment, storage and processing of beets it is possible to increase the volume of sugar even having decreased the area planted in this crop to some extent. The same result could have been achieved by curtailing the large number of specialized enterprises with a low level of beet production.

In 1984 sugar plants processed 71.2 million tons of beets and produced 7.95 million tons of sugar. In order to produce this quantity of sugar from root crops having a sugar content of 18 percent, as foreseen by the country's Food Program, and with an output of 14-14.1 percent, we would need to supply only 56-57 million tons of sugar beets for processing.

Thus, raising the level of agrotechnology in farming, of mineral and organic fertilizer supplies and of new technology for beet production will enable beet-sowing enterprises to achieve productivity indicators for the sugar beet varieties and hybrids used equal to indicators achieved on state test plots.

At the present time practically all beet-sowing oblasts have been supplied with varieties and hybrids that are suitable for industrial technology. Moreover, in 4 years of the 11th Five-Year Plan (1981-1984) 27 new highly productive varieties and hybrids, combining high productivity with a sugar content of 17.7-19.6 percent, were subject to state testing. In addition to this, among our variety resources of sugar beets we have varieties with an even higher sugar content, such as Yaltushkovskaya Odnosemyannaya (with a sugar content of 20.8 percent), Vnisovskaya Gibrid (20.3 percent), Lgovskiy-MS-9 (20.5 percent), Ramonskaya Odnosemyannaya 54 (20.5 percent), Ramonskaya Odnosemyannaya 56 (20.6 percent), Uladovskaya Odnosemyannaya 56 (21.1 percent) and others.

In connection with this it is expedient to concentrate the efforts of the smaller number of specialized beet-sowing enterprises on fulfilling measures to increase the sugar content of beets to 20-21 percent. These measures include increasing the proportion of sugar varieties (to 25 percent instead of the 2 percent of today) in the fields, the selection of varieties with different maturation schedules and the organization of harvesting of this crop during the optimal period. It is expedient to trim leaf rosettes together with the crown, which contains little sugar, from root crops which are processed directly according to schedule without preliminary storage--this will raise the productivity of equipment in sugar plants and will decrease losses of sugar in the pulp and syrup. The trimming of crowns at a level of 10 percent of the mass of root crops will enable us to avoid the scattering of leaves during combine harvesting and to correspondingly curtail losses of feed resources. At the same time, the sugar content of root crops can be improved by 1.5-2 points and brought up to 21-21.5 percent and sugar output from trimmed beets--to 18 percent.

It is essential to raise the level of beet specialization and of the corresponding concentration of beet crops within a radius in which sugar plants operate. Having thus excluded rail shipments of root crops we can organize, to a significant degree, the flow method of beet harvesting according to established schedules and to deliver beets to sugar plants using only motor vehicle transport. This means of organizing beet-harvest work improves the industrial qualities of the raw material, significantly curtails losses of beets and sugar in the process of harvesting, shipment and storage and decreases manpower expenditures.

Estimates show that in order to produce 9 million tons of sugar in the near future we will need about 50-60 million tons of beet root crops with an 18-20



percent sugar content. This quantity of raw material, if the beet harvesting and shipment schedule is adhered to, can be processed in existing plants within a shorter period, and in some zones--within 60-65 days, i.e. in the time it takes to harvest the crop. Thus long-term storage of beets on the fields of sugar plants is no longer necessary and on the whole the output of sugar from beets will increase. At the same time in agriculture it becomes possible to free about 2 million hectares of arable land for the purpose of cultivating other crops, about 200,000 persons involved in beet farming and a large number of transportation resources as well.

The freed land areas can be used to raise oil-bearing crops, corn and legumes, the shortage of which is hindering an increase in the output of vegetable oil and the production of feed protein for livestock raising.

The substitution of less labor-intensive crops for sugar-beet cultivation will have a positive effect on the balance of labor resources in a significant number of kolkhozes and sovkhoses.

Large reserves for economizing on the expenditure of production resources can be found in improving the structure of the balance of food fats. In the production and consumption of food fats in our country the proportion of animal fats (71-72 percent) is high, including butter (18 percent), whereas in leading foreign countries with developed livestock raising the proportion of these types of fats is significantly lower.

It appears expedient to increase the proportion of vegetable oils to 35-40 percent. A decrease in the proportion of animal fats in the food ration will enable us to significantly decrease national economic expenditures for the reproduction of the quantity of food fats required for balanced nutrition because expenditures for the production of sunflower oil are smaller by a factor of about 10 than those for the production of butter. Calculations show that in order to increase the proportion of vegetable oils within the structure of nutrition it is essential to increase the production of vegetable oils for food purposes to 15.7 kilograms per capita in 1990. The implementation of this program, in addition to increasing the production of oil-bearing seed, will require the expansion of the raw-materials base for the oil and fat industry, an increase in the production of industrial equipment, a considerable improvement in the quality of margarine products, expanded production of margarine and mayonnaise and a considerable improvement in products structure in the dairy industry.

One of the most complicated questions is that of increasing gross yield of oil-bearing seed in our country. In 1980-1983 the production of oil-bearing seed in the USSR reached 5.9-6.2 million tons, whereas in 1973 it equalled 8.2 million tons. The drop in the yield of oil-bearing seed occurred as a result of the weakening of attention to the cultivation of oil-bearing crops and above all--to sunflowers. As a result of decreasing the productivity of individual oil-bearing crops and of decreasing sowing area from 6,364,000 hectares in 1966-1970 to 4,973,000 in 1983 a tendency has developed to decrease the production and procurement of seed. In a number of rayons unfavorable trends have in part been the result of displacement of oil-bearing

crops by industrial crops, of the low income derived from the production of oil-bearing crops and of the insufficient application of mineral fertilizers.

The structural changes in agriculture proposed by us, based on the freeing of 2 million hectares of arable land from sugar beets, will enable us to considerably increase the production of oil-bearing seed. Calculations show that in order to produce additional resources of vegetable oil we must increase the production of oil-bearing seed by about 1,500,000 tons. Thus, it is possible to introduce about 960,000 hectares of crop land in oil-bearing crops to the crop rotation. The need for additional area can be sharply decreased by means of the application of optimal doses of mineral fertilizers to oil-bearing crops and on this basis of raising the productivity of oil-bearing crops by 2-3 quintals per hectare as compared to the levels indicated in the country's Food Program. A significant quantity of vegetable oil can be freed for food purposes by means of curtailing its use for industrial needs and by expanding the volume of production of synthetic cleaning aids and paint and varnish products made from petrochemical raw materials. It is expedient to expand the area in mustard for the purpose of producing mustard oil to satisfy the needs of the bread-baking industry, in the castor plant (essential for the production of castor oil) as well as in crown flax. From the oil-bearing seed of these crops at the present time we produce no more than 3 percent of vegetable oils, which is significantly less than needed for industrial purposes. At the same time we must improve technical equipping of enterprises which cultivate oil-bearing crops, increasing for this purpose the manufacture of equipment for the cleaning, drying and sorting of oil-bearing seed. In the oil-extraction industry it would be expedient to create a reserve of capacities that will assure the timely reception and processing of oil-bearing seed during high-yield years.

The most important condition for improving the structure of producing and using food fats is that of accelerating the pace of development of the margarine industry and of radically improving the quality and structure of margarine production. It would be expedient to direct no less than 48 percent of vegetable fats toward the output of margarine products, having increased the output of improved varieties of sandwich and dietetic margarines with various fat contents by a factor of 5-6 and the output of mayonnaise--by a factor of 6-7. The total volume of margarine production in the country should be increased to 2,200,000 tons, of mayonnaise--to 800,000 tons annually as compared to 1,263,000 and 107,000 tons respectively in 1980.

Structural changes in the balance of food fats are directly related to improvements in the structure of milk processing and to making use of milk protein resources that are not being used for food purposes today.

The quantity of milk protein allocated for food purposes depends on the structure of milk processing. In 1983 52 percent of state milk resources was utilized for the production of butter and only 48 percent--for the production of whole-milk products, cheeses and canned goods. Because of the fact that a large portion of resources of whole milk is being directed at the production of butter, the production volume of other dairy products is limited. For example, in 1980-1983 the per capita output of cheeses in the country comprised about 2.4 kilograms with an existing consumption norm of 6.6

kilograms per person annually. Insufficient quantities of pot cheese, cottage cheese products and sour-milk products are being produced.

In processing milk into butter only butterfat is extracted from it. The other components, more valuable for man's nutrition, such as milk sugar (lactose), vitamins and enzymes, are used in secondary products of butter production--skimmed milk and buttermilk, the largest part of which is not processed due to technical difficulties and is returned to agriculture for feed purposes.

At the present time over 60 percent of all resources of defatted milk and buttermilk produced in the dairy industry during milk processing is used for feed purposes.

Calculations show that the use of secondary products from butter production in livestock feed is very low in effectiveness. Thus, for 1 kilogram of weight gain in cattle it is essential to use about 25 kilograms of skimmed milk with a milk protein content of 600-800 grams. From 1 kilogram of weight gain we produce 500 grams of meat in slaughter weight, containing only 50-80 grams of animal protein that can be assimilated by man--this is almost 10 times less than the initial quantity of milk protein. In other words, animal proteins produced via the utilization of milk proteins by the bodies of animals become 10 times more expensive than milk proteins. For this reason in a number of foreign countries the practice of feeding dairy proteins to animals has been discontinued. Young animals are fed whole milk substitutes (ZTsM) that are produced on a non-milk basis. Components such as vegetable proteins and fats, meal from cereal grass and legume crops, meat-bone and fish meal, groats and grass meal are introduced into the whole milk substitute. This enables us to decrease the cost of ZTsM production tenfold. In our opinion, it would be expedient to make a transition to this type of feeding of young animals in our country as well.

Taking the experience of foreign countries with developed livestock raising into consideration it would be expedient to increase the proportion of milk for producing cheeses, pot cheese and whole-milk products and to increase the production of these products to the recommended consumption norms. Here we should considerably expand the assortment of butter by means of increasing the production of varieties of butter with various additives.

The assortment of cheese products should be expanded in the near future on the basis of accelerated growth in the production of soft cheeses which do not require large capital investments for the creation of capacities; there should also be a considerable expansion in the assortment and an improvement in the quality of pot cheese items.

In the future we should significantly curtail the use of skimmed milk and buttermilk as livestock feed, and use hard cheese and cottage cheese whey, groats and phosphatides from oil and fat production, protein from soybeans and legume crops, and grass meal for the production of ZTsM, which will effect the normal reproduction of herds of cattle and hogs. At the same time we should increase the scale of production of bread and roll, confectionary and sausage items containing supplements of dry defatted dairy products (defatted milk, cheese whey and others).



It is essential to accelerate the introduction of membrane technology and techniques (ultrafiltration, electrodialysis and so forth) to obtain principally-new food products--soluble whey protein concentrates and amorphous lactose concentrate. The production technology for many dairy products (cheeses, pot cheeses, lactose, food products for children, ice cream, dessert dairy products, beverages and so forth) thus becomes waste-free.

In connection with this in the future it will be possible to include additional resources of milk protein in the food ration, which will enable us to increase the economic effectiveness of economic operations on the part of the country's dairy product subcomplex.

Also essential are other measures directed at improving the functions of the economic mechanism in the country's dairy product, sugar beet and oil and fat subcomplexes. Above all we should make a transition from accounting for milk production according to butterfat balance to the creation of a complete balance of all basic nutritional components; we should accelerate the introduction of a new standard that takes into account the indicators of acid number in raw milk.

One of the reasons for great losses of raw materials and ready production involves the lack of balance in the technological structure of fixed production capital between related links of production subcomplexes and between the processes of reproduction and use of individual elements of fixed production capital; another is separateness in technological policies concerning the renewal of various elements of fixed capital. For this reason it is very important to develop, within the framework of each product subcomplex, a single technological policy in accordance with which restructuring will be implemented within the structure of production processes.

In need of serious reevaluation is the system of procurement and accounting prices for many types of agricultural raw materials and products derived from processing these raw materials, especially for milk of various grades, secondary products of butter and cheese production, whole milk substitutes, seed of oil-bearing crops and products of the oil and fat industry. Butter sales to the population are subsidized whereas there is clearly a shortage of allocated capital investments for the development of production of vegetable oil. It is expedient to formulate prices for milk on the basis of actual expenditures made for its production within agriculture and on the basis of a consideration of the number of useful components in milk translated into dry-substance terms. Here the cost of 1 ton of skimmed milk and buttermilk will comprise about 170 rubles, i. e. it will be 17 times greater than the price at which they are now sold, and the net cost of 1 ton of ZTsM prepared from these products will equal 2,700 rubles. Prices that reflect true expenditures for the production of dairy products will encourage their use for food purposes. At the same time we should strengthen the material interest of enterprises in the development of production of oil-bearing crops.

The most important condition for the overall solution to problems of economic stimulation, planning, material-technical supply, the elimination of

losses and disproportions, the development of structural changes and the distribution of financial resources and capital investments is the creation of a single organizational structure for managing the agroindustrial complex. This will make the economies of productive subcomplexes maximally receptive to scientific-technical progress since interest will grow in related links as concerns the implementation of achievements of scientific-technical progress to secure the goal of higher end results.

These results will be greatly affected by measures to implement the resolution of the CPSU Central Committee and USSR Council of Ministers, "On Extensively Disseminating New Methods of Management and Strengthening their Effect on Accelerating Scientific-Technical Progress." The establishment of tasks related to the production of end products expressed in natural terms and of capital for material-technical resources for the product subcomplex in general, an improvement in certification of products, the use of flexible prices for products with a production-technical purpose which stimulate the renewal of fixed capital will strengthen the intensification of processes to curtail the expenditure of production resources.

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## LIVESTOCK FEED PROCUREMENT

### RAPE CULTIVATION PROMOTED FOR FEED PROTEIN CONTENT

Moscow SELSKAYA ZHIZN in Russian 4 Jan 86 p 2

[Article by Nikolay Osyckin: "Abundant Rape: Actively Solving the Rape Problem!"]

[Excerpts] For livestock raising, solving the protein problem is now one of fundamental tasks of all APK [Agroindustrial complex] collectives and party organizations. Life itself requires that we make a decisive change in this situation. We cannot be indifferent to the fact that half of the grain allocated for concentrated feeds is utilized after simple grinding or in the form of unenriched mixtures. In most places 20 kilograms of grain receive only 1 kilogram of high-protein supplements--this is five times less than the scientifically-based norm. This leads to wastefulness and mismanagement and to a depression of economic indicators in agriculture. It is quite justifiably written in the draft of the Basic Directions that in coming years it will be essential to significantly increase the production of vegetable feed protein by means of expanding the area in and productivity of alfalfa, clover, peas, sunflowers, soybeans, rape and other crops having a high protein content.

Of the aforementioned crops, let us look at rape. A great deal has been written about its advantages. Each hectare of rape, yielding 20 quintals, provides 11-12 quintals of oilseed meal consisting of 55-60 percent protein, as well as 7-8 quintals of feed oil. It is difficult to find another crop that is characterized by such abundance. For example, in order to obtain the same amount of protein from barley we would need to produce a harvest of about 70 quintals per hectare.

The USSR Food Program foresees increasing rape production in our country to 1.5 million tons by 1990, including in the RSFSR--to 1 million tons, and in the Ukrainian SSR and Kazakh SSR--to 210,000-230,000 tons. The APK has taken its first steps toward dealing with the task. Work in breeding and seed farming and cultivation technologies have been strengthened. Five varieties free of erucic acid and low in glucosin have been developed; another 28 have been regionalized for use for both industrial and feed purposes. This includes Kubanskiy, Evvisa, Vem, Kvinta, Garant and Salyut. A network of seed farming enterprises has been created; the needs of kolkhozes and sovkhoses for seed are fully satisfied.

In other words, the possibilities do exist for achieving planned goals. However, these possibilities are still being utilized unsatisfactorily. In 1985 the area in rape for seed equalled only 113,000 hectares, or less than in 1984. Gross grain yield did not reach even a tenth of the amount planned for the end of the five-year plan. Very little seed became a part of state resources. Why is it that rape is cultivated for green feed but little is produced for seed, which provides protein and oil? There are several reasons for this. The main one is the passive position of many directors of kolkhozes and sovkhoses and of APK organs as concerns solving the protein problem and their underestimation of a valuable crop such as rape.

Meanwhile, in places where the technology and agrotechnology for cultivating rape have been comprehended the crop has become a real gold mine for enterprises. In Prapor Kommunizmu Kolkhoz of Kolomyyskiy Rayon, Ivano-Frankovsk Oblast, for example, 40 quintals of rape seed are produced per hectare from year to year. Each hectare yields over 1,000 rubles in profits. The use of high-protein oil cakes as supplements to feeds has enabled the enterprise to increase milk yield of farms to 4,300 kilograms per cow and to increase weight gain in livestock and fowl. The enterprise has fulfilled its five-year plan for the sale of products to the state. Zhovtneva Revolyutsiya Kolkhoz of Gorodenkovskiy Rayon increased the productivity of winter rape to 34 quintals per hectare, and Kolkhoz imeni Bogdan Khmel'nitskiy of Tlumachskiy Rayon--to 29 quintals. Here also a high level of livestock productivity was achieved.

Unfortunately, there are few such enterprises in the Ukraine. On the average throughout the republic the productivity of rape does not exceed 11 quintals per hectare. In comparison to 1950 sowing area has decreased sixfold and comprises only 17,000 hectares. Even in the base Ivano-Frankovsk Oblast, where a 20-quintal yield has been achieved, there are enterprises which produce only 2-3 quintals of oil-bearing seed per hectare.

Attention is not being focused on cultivating rape in Lvov and Rovno oblasts, where cultivation area has been sharply curtailed. In 1985 Transcarpathian and Chernovitsy enterprises allocated only 200 hectares each to rape. The yields that are produced here are also low. Many kolkhoz and sovkhos directors feel that rape is a second-rate crop without decisive significance for strengthening the feed base. This is a great delusion! In skilful hands rape is an important reserve for strengthening feed production and for growth in the productivity of livestock raising. It is vexing that not everyone knows yet about the crop's possibilities and about new highly productive and high-quality varieties.

"And where will we get the seed?" one hears frequently from directors of enterprises and from specialists.

More often than not this question is purely one of self-justification and not of a practical nature. Generally speaking there are no problems with supplies of rape seed. All that is needed is a desire to seriously begin cultivating rape. Lipetsk Oblast is a good example of this. Several years ago work with rape was begun here with literally 1 kilogram of seed, and now 10,000 tons are



produced for sale here. This quantity is sufficient to sow over 1 million hectares in this country. As of now, 6,000 tons have been sold.

I had occasion to visit Lipetsk enterprises and to meet with enthusiasts of rape cultivation. Things are managed here with soul. In 1985 the new crop was raised on 20,000 hectares. From half the area the harvest was utilized for seed purposes, from the other half--for green feed. An average of 15.5 quintals of seed were produced per hectare. 50 Let Oktyabrya Kolkhoz harvested 24.5 quintals per hectare, Zavety Iliche Kolkhoz--23.1 quintals per hectare and Krasnyy Kolos Sovkhoz--22.8 quintals per hectare.

But here is the problem. The enterprises do not have modern sorting machines, and cleaned seed lies in piles--there is nothing to pack it into. The Ulyanovsk enterprise of Rostekstiltorg [All-Russian Textile Trade Association] was to supply the oblast with 165,000 bags during the third quarter, but fewer than half that amount were delivered. The orders and requests for seed are here somewhere...

In discussing Lipetsk rape we cannot bypass a number of problems. Branch development requires an improvement in the system of processing raw materials. Two years ago in the oblast I was shown the design for a large plant to produce oil and oil cakes which is to be built in Zavety Iliche Kolkhoz. But the matter has not proceeded beyond the paperwork stage. In Gryazinskiy Plant of Hydraulic Equipment the manufacture of compact presses for pressing out oil and oil cakes was organized. But to some director in the food industry this smacked of "antiquity" and their production was arrested. Instead of 100, only 40 were produced. In this case where can oil-bearing seed be processed? Also awaiting a solution are the problems of building a seed-cleaning plant, of expanding breeding work and of improving the technology for cultivating rape, and not only in Lipetsk Oblast.

Enterprises in Gorkiy Oblast attempted to expand the area sown in rape. But they were unable to find sowers for precise seeding or means for protecting plants. In Omsk Oblast experience in rape cultivation has also been amassed but there the circle of enterprises which have recognized the worth of the crop is small and for this reason the oblast as a whole did not fulfill its seed-production plans. Timid steps are being taken in this regard in the Central, Volga-Vyatka and other economic regions of the RSFSR.

Meanwhile the "breakthrough" in the protein direction must be bold and decisive. We cannot tolerate the fact that some APK directors simply are not burdening themselves with concern about the cultivation of rape and other protein crops and are waiting for the government to supply their enterprises with soy or sunflower oil cakes. Can it be considered normal when each year the kolkhozes and sovkhozes of Belorussia import 66 percent of the needed protein raw material, of the Lithuanian SSR--66 percent, Estonia--65 percent and Latvia--50 percent! Perhaps the land here is poor or the climate is severe? No.

As data from scientific institutions and specialists shows, spring rape can be cultivated on large areas in the European part of the country in Belorussia, the Baltic states, the Non-Chernozem Zone of the RSFSR, the Urals, the

Transurals, Siberia and Northern Kazakhstan. Winter forms of this crop must become widespread in the Ukraine. According to the Food Program, at the end of the new five-year plan it is planned to sow 1.6-2 million hectares in seed rape, and in the future--3 million hectares. Proposals are being made on assigning enterprises plans having to do with the sale of rape seed. If such assignments are made the area for this crop will be found.

Time itself is pushing rape forward into a leading position in farming. The delivery of fertilizer and pesticides in the necessary quantities and the manufacture of special machines for cultivating and processing seed are planned. It is planned to produce over 3,500 presses for the production of oil cakes and oil in enterprises. It would be expedient to build shops for rape processing in interenterprise mixed-feed plants. Problems related to the material stimulation of enterprises involved in raising rape have now been solved. The procurement price for seed has been raised; the countersale of oil cakes at a rate of 50 kilograms per quintal of delivered seed has been allowed. Kolkhozes and sovkhoses may participate in all-union competition to produce large yields, with awards awaiting the victors.

In other words, the ice has begun to break, however slowly. It is important to do away with indifference as concerns the protein problem as soon as possible, to give rape "the green light" in the fields and to supply farms with sufficient amounts of full-value feeds.

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## LIVESTOCK

### INTENSIVE SHEEPBREEDING PROMOTED IN KAZAKH SSR

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 3 Nov 85 p 2

[Interview by T. Kvyatkovskaya with Fazul Mukhametgaliyevich Mukhamedgaliyev, academician of VASKhNIL [All-Union Agricultural Academy imeni V. I. Lenin] and the Kazakh SSR Academy of Sciences and director of the Institute of Experimental Biology of the Kazakh SSR Academy of Sciences: "Justifying the Hopes of Sheep Breeders"]

[Text] "The front line in the struggle to accelerate scientific-technical progress lies in science," noted Comrade M. S. Gorbachev in his report at the June meeting of the CPSU Central Committee. In preparing for the 27th CPSU Congress, the republic's scientific institutions today are determining their main strategic tasks for the 12th Five-Year Plan, viewing them through a prism of the requirements of the times--the requirements of a decisive turning by science toward the needs of public production. What are these strategic tasks? What is being done to complete them successfully? This is the subject of our interview with Fazul Mukhametgaliyevich Mukhamedgaliyev, academician of VASKhNIL and the Kazakh SSR Academy of Sciences and director of the Institute of Experimental Biology of the Kazakh SSR Academy of Sciences.

[Question] Kazakhstan is the largest livestock raising base in the country. A leading role in livestock raising is occupied by a branch that is traditional for the republic--sheep raising. What contribution by the institute toward improving sheep raising is possible and essential for the intensive production of livestock products?

[Answer] For long years the republic's scientists and breeders were involved in the development in Kazakhstan of breeds, breed groups, types and lines of fine-wooled sheep to replace the traditional coarse-wool types. This was dictated by the need for fine wool by industry. Today the breeds that are available for this purpose include the Kazakh Fine-Wooled, the Kazakh Arkhar-Merino, the Southern Kazakh Merino and the Northern Kazakh Merino. Their total proportion in the republic as a whole is about 60 percent. But for the production of high-quality knit goods and special pieces of cloth, semi-fine

wool is also required. Thirty percent of the total amount must be of this type. Consequently, within the development of the branch the time has come for crossbred sheep--a meat sheep with wool of a semi-fine quality. Here is one of our most large-scale tasks.

[Question] Does Turgenskiy Sheep Raising Sovkhoz already have a crossbred herd? There the yield of wool from a one-year-old sheep reaches 6 kilograms, and the animal weighs 70 kilograms.

[Answer] Quite right. This is one of the base enterprises where for many years now not only has scientific research been conducted but breeding work has also been carried out on a production scale. Our institute has nine such bases in Alma-Ata and East Kazakhstan Oblast, and the herd of crossbred sheep of the new type numbers over 100,000 head. As you can see, in order to solve the problem we are trying to advance on a broad front.

[Question] I would like to return to fine-wool sheep. There are good fine-wool breeds in the republic. But light industry still complains about the low quality of fine fleece that is received for processing. What is the problem?

[Answer] And this is our second large-scale task. Let's look at the picture in sheep raising today. The basic herd of fine-wool sheep is concentrated in habitable regions. Here the pasture problem is very severe. It is wasteful to allocate good lands suitable for plowing for the purpose of pastures. Those that are available are greatly overstocked with animals. The result of overstocking is a beat down, trampled and sparse grass stand. Under such conditions it is difficult to raise or even to support the achieved level of production output. This means that research must be conducted in two directions. The first is to render habitable land that is unsuitable for farming as well as dry steppe, mountain and cone-shaped hill zones and to introduce and broadly regionalize arid crops. This is the task of specialists of the meadow-pasture industry. The second direction is to adapt a portion of the sheep herd to the difficult conditions of the new pastures and to make flocks hardy and resistant. This is our task. In recent years we have been trying to develop a scientific-production base and a foundation for the transition of sheep raising to an intensive track in a large region of East Kazakhstan, for example. We have done this. But this does not mean that we have solved the problem.

#### For Reference

For over 20 years farmers of Katon-Karagayskiy, Zaysanskiy, Tarbagatayskiy and several other rayons of East Kazakhstan tried to improve coarse-wool local sheep by using the Altay breed. Breeding work was carried out in enterprises without the necessary scientific supervision and in an uncontrolled manner. As a result, mixtures of various generations of the Altay fine-wool breed have appeared in these zones. They are not uniform in level of meat productivity. Judge for yourselves--the weight of a year-old ewe [first lambing] is 25-30 kilograms. The wool yield per sheep is 2-3 kilograms (and in terms of pure fiber this equals only 1 kilogram). The quality of fine wool is low. According to data from the Semipalatinsk factory for the primary processing of wool, only 10-12 percent of the raw material submitted by this zone's

sovkhozes is first class; the rest is short, poor-quality wool. There is still another alarming shortcoming--the reproductive capabilities of these animals are low. Newborn calves are small, delicate, with a weakened constitution and not adapted to year-round pasture upkeep. We cannot change climatic conditions, as Comrade M. S. Gorbachev rightfully noted at a meeting in Tselinograd. This means that the breed must be changed.

[Question] The situation is truly complex in this zone. Some economic planners are of the opinion that it is necessary to return to the old--to the reproduction of hardy meat sheep with coarse wool. What do scientists think?

[Answer] The workers of our institute have proven that the movement backwards is unjustified. The production of fine wool is to be increased. The Altay breed of sheep has proven itself well under conditions that approximate stall-upkeep. For mountain rayons the breed lacks a developed muscular system, a strong skeleton and hooves and the capability of moving rapidly along broken terrain. These are the qualities that are required in a new breed, in combination with fine wool and a good weight.

[Question] You said that a scientific-production base for this already exists. Could you be more specific?

[Answer] We have developed a breed group of fine-wool sheep, which could be called the East Kazakhstan Merino. In Sovkhoz imeni Krupskaya and Chiliktinskiy Sovkhoz (Tarbagatayskiy Rayon) and Karabulakskiy Sovkhoz and Sovkhoz imeni Michurin (Zaysanskiy Rayon) flocks have been formed with 12,000 head of pedigree ewes. The Altay, High Blood Australian [Vysokokrovnoavstraliyskiy] and Katonkargay-Bayanaul types of sheep are used for breeding. The new group still has not passed state certification--for this a herd of no fewer than 100,000 head is needed whereas we have only 50,000 in specialized herds in experimental enterprises. But the "pluses" of the new sheep persuade us of the need for their widespread regionalization.

[Question] Last year Izdatelstvo Nauka of the Kazakh SSR published a book called "Sozdaniye novykh vidov tonkorunnykh ovets v Kazakhstane" [The Development of New Types of Fine-Wool Sheep in Kazakhstan]. The illustrations of the results of scientific-production experiments in it are fairly eloquent--the sheep are tall, broad-breasted, with sturdy legs and a good fleece density on their backs (which means that when the wool gets wet in the rain it does not fall to the side and will not expose the back of the sheep, thereby preventing the animal from catching cold). The yield of wool from a year-old ewe is over 4 kilograms and the length of the wool is 8-10 centimeters. And how has the problem of reproductive capability been solved?

[Answer] First I would like to mention the solution of two other important problems. First of all, the East Kazakhstan Merino, which is what we are calling the breed conditionally, is hardy, resistant under harsh continental conditions, withstands winter grazing, and can find food under a snow cover of 30 centimeters. This is very important. Secondly, the breed is responsive to supplementary feeding. The more intensive the supplementary feeding, the shorter the time needed to complete it and the lower the cost of weight gain. During the pasturing period we can expect up to 15 kilograms of weight gain

from our new sheep if the animals are additionally fed concentrates (200-300 grams per head daily). The animals that are delivered for meat purposes are not thin, but heavy castrated rams. During the winter stall-upkeep period weight gain in answer to supplementary feedings is even greater. Think about what this will mean to the meat industry and to solving the Food Program. And during dry years when pastures die out, what then? By introducing the new type of sheep we will stop being dependent on the caprices of nature.

[Question] How many years, or even decades, will we need to increase the experimental herd of 50,000 animals to a million head? After all, we know that breeding work is controlled and of long duration, whereas the problem of intensifying livestock raising must be solved rapidly and increased production is needed now, today.

[Answer] At this point let's return to the question of reproductive capabilities. Yes, only breeding flocks, only the best examples of a breed or a type, can be used for breeding work. Yes, one of the best elite ewes will produce a maximum of two lambs per year. Yes, it would require a decade to develop a herd of a million highly-productive select animals. But today the republic's scientists have had great and successful experience in transplanting polyovulate zygotes.

#### For Reference

In their breeding work the institute's scientists have learned to widely utilize the method of embryo transplantation. It all began with the Lincoln breed of sheep, an expensive breed imported from afar. Not adapted to local conditions, Lincoln sheep perished rapidly. It was necessary to import more and it was not always possible to achieve the required number of animals. Workers of the Institute of Experimental Biology began to transplant 2-3-day-old embryos-zygotes from the wombs of delicate mothers into the bodies of sheep of local breeds. What did this do? Firstly, within a 2-day period not just 1-2 embryos (future lambs) are developing in the body of the sheep, but a total of 50-70 fertilized cells. Later the surplus cells perish. But if we do not wait for this to happen we can transplant all 70 zygotes in 70 local sheep and produce not two but 70 lambs. The embryo has received all its main traits from its parent's genes, thus maintaining the pedigree line, whereas the body of the "surrogate mother" provides the progeny with new immunological, protective characteristics, making it more hardy and resistant. This method was worked out and introduced into the practice of sheepbreeding on a large scale in this country for the first time by Kazakhstan's scientists.

This experience can and must be used on a production scale. Having created special production laboratory centers in rayons and in enterprises, we will accelerate the reproduction of the best pedigree herd of sheep by a factor of 50. This will become a real contribution by scientists-biologists to accelerating scientific-technical progress and to intensifying the production of livestock products.

[Question] The formulation of the question radically alters the view of traditional sheep raising. We heard the opinion of scientists regarding the



possibilities of utilizing the transplant method under production conditions as long ago as the Ninth Five-Year Plan. But evidently the development of such laboratory transplantation centers is technologically difficult for agriculture, and your desires are still the scientist's outlook for the future. Is this not so?

[Answer] Not at all. This is not a projection by far. Yes, we do need resources and capital investments. But think for yourself--isn't it worth making the outlay in order to improve and accelerate the matter by a factor of 50? Of course we do need trained specialists for such laboratories. But our research institute is prepared already today to help the zooveterinary institute to train them. Our workers are ready to be managers and consultants for production laboratories. Incidentally, discussions concerning the creation, during the 12th Five-Year Plan, of the first such inter-rayon center on the base of enterprises of Iliyskiy Rayon of Alma-Ata Oblast are now being carried out with complete seriousness. All that is left is to move more quickly from talk to action, and the faster the better. Another reason for this is that once this important step has been taken we will exclude the possibility of drifting in breeding work in every enterprise, we will avoid cases of deterioration of the flock in places where just yesterday these flocks corresponded to contemporary requirements and we will take control of the quality of the entire sheep herd in the republic. And for the future we will achieve a minimal, short path from new research by breeders to its introduction into practice.

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REGIONAL DEVELOPMENT

UDC 911.2:528.27

CONTROL OF UNFAVORABLE LANDSCAPE PROCESSES IN MOLDAVIA

Kishinev SELSKOYE KHOZYAYSTVO MOLDAVII No 5, May 85 pp 58-59; No 9  
Sept 85 pp 65-67

[Article by V. Verina and M. Bolfos, MSSR Academy of Sciences, under the rubric: "The Forest. Nature's Protection"; follow-up commentary by V. Bordyug, deputy minister of the MSSR Ministry of Forest Management]

[Text] Eroding, slipping, collapsing, subsiding, undermining, karst and other relief-forming processes determine the development of the earth crust surface and the formation of its natural landscapes. However, modern relief-forming processes largely overlap or interlock with man's economic activity and, thereby, produce unfavorable aftereffects on the landscapes.

Deep landslides develop along the structural dislocation lines and are a highly destructive force. In sections where these landslides develop, a complete restructuring of the slope profile takes place and this, in turn, causes a complete reshaping of significant area complexes. The study of other natural factors, affecting the appearance of landslides (abundant precipitation, floods and others) established a rhythm (Yemelyanova, Ye. P., Proka, V. Ye., 1982, Poruchik, F. S., 1929) of these processes in different regions, including those in Moldavia.

A strong activation of landslides on the Dniester-Prut interfluvium was recorded in the seventies and eighties of the last century and in 1911-1915, 1933-1937, 1947-1950 and 1967-1973 in the twentieth century. It should be pointed out that in many cases the appearance of landslides, ravines, cave-ins and other unfavorable phenomena has coincided with socioeconomic events, which inflicted great damage on the natural landscapes. Thus, in 20 years (1861-1881) in Bessarabia 72,201 desyatinas [desyatina=2.7 acres] of timber were cleared and the area of unproductive land increased by 31,474 desyatinas. By 1880 the area of unproductive land in Bessarabia was already 202,198 desyatinas (Proka, V. Ye., 1983). The activation of landslides in 1911-1915 significantly affected the slopes of the Chuluksk-Solonetsk upland, Kodry, Pridniester upland, and the south of the Dniester-Prut interfluvium.



The marked activation of landslides in 1933 as well as in 1948 to 1950 was related to abundant precipitation. The landslides of 1967-1973 were also caused by an excess of precipitation of the regular perennial cycle.

The general washout of soil, the forming of ravines and the accumulation of debris, brought by the water currents to the foot of slopes, river flood plains and basins, are important in the reshaping of the landscape lithogenic base as well. According to a summary investigation report for 1911-1915, there were 10,675 ravines with a total area of 149,864 desyatinas in Bessarabia.

Territorially, the ravines did not develop uniformly in the districts. The highest number of ravines at the beginning of our century was at Yalpug River basin, where their proportion constituted 2 percent, and in the middle part of the Botna River--up to 3 percent, and in the lower reaches of the Reut River--also, 2-3 percent. The proportion of ravines reached 5 percent only on the western slopes of the Kodry. Ravines did not exceed 1 percent in the northern part of Moldavia (Brichanskiy, Oknitskiy, Yedinetskiy Rayons).

Unfavorable phenomena increased particularly in 1968-1973 as a result of intensive cultivation of sloping lands against a background of regular cycle, more abundant precipitation.

Intensification, use of machinery and chemicalization of agricultural production as well as an increase of effluents, polluted with household and industrial wastes, have increased the corrosiveness of groundwaters by a factor of many tens of thousands (acid and alkaline reactions); as a result a nonuniform, in terms of land and time, dissolving starts to take place that is difficult to estimate and to predict, especially if their negative aftereffects are considered.

The main problem is to have protection against polluted waters getting into the soil and subsoil levels, which consist of soluble rocks. In the last 30 years, an increase of karstic processes has been observed running the length of high voltage electric power lines and in places of mass groundings of lightning rods, antennas and others.

The intensification of unfavorable processes with time leads to profound changes in the landscapes, which have completely lost their capacity for self-restoration. Exogenic unfavorable processes have become activated particularly in places where cutting of timber or intensive plowing is being conducted along structural fault lines; the faults have caused significant elevations (relative heights) as well as vertical displacements of water in zones (surface zones from top to bottom, and depth zones--injected from bottom to top), weakened by structural position. Examples of this are the Nisporenskiy and Kalarashski Rayons where 4,912 and 5,008 hectares (6.99 and

6.52 percent of the land area of each of these rayons) were covered by landslides in 1983, and the total land area taken out of operation was 8.2 percent and 7.5 percent respectively from the total land area of these rayons.

Karstic formed regions are particularly prominent in Grigoriopol'skiy, Dubossarskiy, Rybnitskiy, Kamenskiy, Rezinskiy, Sholdanesht'skiy, Floreshtskiy, Orgyevskiy, Brichanskiy, Yedinetskiy, Ryshanskiy and Glodyanskiy Rayons; however, no one studies them specifically and they and the rocky soils are not marked in land management books, but appear in a column under "other".

One of the measures for controlling such unfavorable phenomena and processes or at least delaying them is forestation.

Protective forest belts were planted to control gullies and landslides, and special nurseries were established to grow the planting material. However, these operations were carried out basically in forest glades and cleared areas within forest stands, and not on lands that are no longer in use and not on steep slopes. The total area of forest lands in the 11th five-year plan will increase by 16 thousand hectares, and before 1990 by about 30 thousand hectares (Shikimaka, 1980). The growth of forest lands in the republic will take place primarily through forestation, which will become an important aspect of landscape optimization. Probably, the cultivation technology of farm lands and forest reclamation standards should be changed in Kodry, particularly in Nisporenskiy and Kalarashskiy Rayons because of their vulnerability and dislocation by exogenic processes.

Analysis of the MSSR land resources shows that, starting with 1964 to 1983 inclusive, the gradual growth of land resources of the Ministry of Forest Management was basically at the expense of unproductive and arable lands, broken up by ravines.

An inspection of eroded areas, from a helicopter (summers of 1983-1984), showed that forestation has been conducted not along the ravines, but in the areas between them. And, soil preparation for tree planting was conducted from top to bottom on the slopes. The ravines, left in a virgin state, continue to grow and silt the basins and fertile flood plains (Vulkaneshtskiy, Kantemirskiy, Kaushanskiy, Komratskiy, Vuvorovskiy and other rayons).

To control landslides, inferior tree species are being planted that do not adapt well to the conditions of Moldavia and perform poorly the climate-forming, recreational and other functions that the aboriginal forests, which have adapted over thousands of years to the local natural conditions, do. The percentage of oak plantings and associated species is sharply dropping and the beech tree is generally not being restored in Kodry, except for the 15 hectares of beech planted in 1983, despite the fact that in the past beech trees were the pride of Kodry.

Now, the lands transferred to the forest resources are being planted with birches, acacias, pines and spruce. Ecologically unstable monocultures are being developed that are biologically incompatible with many farm and forest cultures of Moldavia. For example, birches with oaks. Acacia has become a weed plant in all the forests of Moldavia from Vulkaneshtskiy Rayon in the south to Brichanskiy Rayon in the north. Everyone knows that in 16-20 years the acacia ages and becomes dry. The question is: what will the forests be like in the year 2000? The birch is also short-lived. The birch, with its delicate crown and small leaves, absorbs little moisture from the slipping slopes, while in the past in Kodry the slipping slopes were stabilized best of all by beech forests. Why doesn't the forest management personnel study the centuries-old experience of nature and use it in the forestation of slipping slopes?

The development of machinery has had a significant effect even on the relief. Quarrrystone and gypsum are extracted by an explosive method in Moldavia. At the exploitation sites, excavations remain that are 10 to 60 meters deep. Small explosions and bulldozers cover up the ravines, gullies and sink holes; excavators are used to dig trenches for basins and building foundations; gentle slopes running the length of roads and buildings are cut with powerful machinery; man-made terraces are developed on slopes; passageways are made underground when sawn stone is extracted; whole "mountains" of marl are piled with cutting of quarrrystone. These measures lead to rapid levelling of the original relief, filling of basins, gullies, lowlands (river basins) and meandering of rivers.

Shell limestone is intensively extracted as a building material and particularly reef limestone for quarrrystone, and they are cut on the spot, leaving "mountains" of limestone marl which is not removed for many years (Koban Glodyanskiy Rayon, Varatik, Ryshkanskiy, Brynzeny and Feteshty Yedinetskiy Rayons and in many other places). Elements which are undesirable for living organisms are released when limestone dissolves under the influence of atmospheric precipitation; primarily, such elements as calcium carbonate get into wells and springs whose water is consumed by the population and domesticated and wild animals for drinking purposes. The limestone gets into dams and rivers, changing their composition. The dissolving of limestone and gypsum outcroppings, not only in the form of production marl, grows by a factor of hundreds and thousands because of the corrosiveness of the falling precipitation that increases the concentration (mineralization) and pollution of drinking waters.

For the correction of existing landscape dislocations in Moldavia and the prevention of new ones, half-measures are inadequate and what is needed is a whole complex of measures that will be able to prevent the destruction of landscapes, which in the past have been quite picturesque and fertile. This primarily concerns Nisporenskiy and Kalarashskiy Rayons which are located at the joining of two deep structural fault lines (Bilinkis, Drumya and others, 1978) and have the highest drops in altitude (relative altitude to 350 m); these

faults consist of thick stratifications of friable deposits, injected by deep waters which are saturated with various microcomponents, some of which have curative properties. In Kalarashskiy and Nisporenskiy Rayons, the plowing of slopes should be forbidden, and dislocated slopes should be forested (up to 50 percent of the land) with native species of trees and shrubs. The work should be directed along resort-recreational lines based on existing medical-recreational resources.

In highly karstic rayons (Rezinskiy, Sholdaneshtskiy, Kamenskiy and others) the percentage of forested lands should be brought up to 20-30 percent; they should be developed uniformly, not as a spontaneously developed recreational economy based on the available local medical-recreational resources.

#### ANOTHER OPINION ON: "CONTROL OF UNFAVORABLE LANDSCAPE PROCESSES IN MOLDAVIA"

The MSSR Ministry of Forest Management has examined the article of Comrades V. Verina and M. Bolfos "Control of Unfavorable Landscape Processes in Moldavia" (No 5, 1985) and notes that the authors are correct in raising the problem concerning the importance of protective forestation under conditions of prominent erosive and landslide processes in the republic.

However, it should be pointed out that some problems in the article are treated too freely and without a factual basis. It is incorrect to say that "The planting of protective forest belts was conducted to control ravines and landslides..." Protective forest belts generally were not used in Moldavia to control ravines and landslides, they were developed along the borders and within rotated crop fields, gardens and vineyards to protect the soil from wind and water erosion. In the past ten years, the forest management bodies have developed 5,814 hectares of field-protective forest belts with the plan figure being 5,600 hectares.

Operations for the forestation of eroded lands were carried out not "on forest glades and cleared lands within forest lands" as the authors claim, but on ravine-gully lands, singled out in accordance with the decrees of the MSSR Council of Ministers specifically for these purposes. Part of these lands were transferred to the state forest resources. During the years of the 10th and 11th five-year plans (1976-1985) forest plantings were conducted on 87,800 hectares (100.7 percent of the plan), including 80,700 hectares on ravines, gullies, steep slopes and slipping soil [landslide].

In the article it is inaccurately stated that forestation was conducted not along the ravines, but "in areas between the ravines", and that the soil preparation for forest planting was conducted from top to bottom of the slopes.



Actually, there were cases in the forestation of ravine-gully lands when the ravines with development of the areas remained unforested. Basically, these were deep ravines with steep slopes that are placed in the category of unsuitable for forest areas, which do not appear feasible for forestation with existing methods. The construction of expensive complex hydrotechnical structures is needed for their development. Nevertheless, during 1968-1984, 11,600 hectares of strictly ravines were forested of the total area of forested ravine-gully lands (131,200 hectares).

In specific cases, top to bottom soil preparation for planting was allowed on slopes, which were broken up by a dense network of ravines, with the average distance between brows of nearby ravines no more than 50 meters. Such soil preparation technology, with the obligatory development of erosion control ridges at right angles to the slope, is allowed in areas with not many water drainage systems ("Recommendations for Foresting Eroded Slopes and Rocky and Saline Soils of Moldavia", Kishinev, "Kartya Moldovenyaske", 1973, p 13).

The problem of the specific composition of new plantings is not treated quite correctly. It must be pointed out that plantings on ravine-gully lands are developed according to plans, worked out by the state planning-investigation institutes of Soyuzgiproleskhoz [State Institute of Forest Management Planning] and Moldgiprozem [Moldavian Institute of State Land Planning]; these institutes outline the specific composition depending on the purpose of the new plantings, taking into consideration the requirements of the tree or shrub species for growth site conditions.

Plantings on landslide slopes include poplars, willows, white acacias, oleasters and other species that fulfill the erosion control role. As for beech, the planting of beech on landslide slopes will not lead to stabilizing slipping soil because of its relatively slow growth and unsuitable growing conditions. Beech is a warm climate species, exacting in respect to soil, and grows only in the Kodry part of the republic. Besides, the cultivation of beech planting material is associated with great difficulties because of the absence of seeds. The existing beech plantings in Moldavia have not produced a yield of seeds for the last 20-25 years.

The planting of 15 hectares of beech, that the authors mention, as well as the planting of beech on an 8 hectare area in 1985, was carried out with planting material brought in from the Carpathian Mountains.

Beech and spruce plantings are developed as small areas just near populated centers and highways with the purpose of producing better leisure conditions for the population. During 1981-1984 the forest management enterprises planted only 100 hectares of birch and 50 hectares of spruce.

The authors speak unjustly against the white acacia. The acacia mixed with soil-protective shrubs protects the soil well against further erosion and stops the growth of ravines on slopes, which are heavily broken by ravines and are subject to landslides. In addition, the acacia is an excellent honey plant. The claim that acacia becomes old in 16-20 years and dries up does not correspond to reality because, after being cut down at the age of 31-35 years, it regenerates.

We consider the problem of increasing the work volumes for forestation of highly eroded and slipping lands in Nisporenskiy, Kalarashskiy and some other rayons with highly eroded lands to be correctly stated. The forest management enterprises have the potentialities for this. However, in recent years the amounts of land (50-70 hectares a year) singled out in these rayons for forestation have been small.

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## AGRO-ECONOMICS AND ORGANIZATION

UDC 631.155

## EFFECTIVE ECONOMIC MANAGEMENT OF TRANSPORT OPERATIONS VIEWED

Moscow EKONOMIKA SELSKOGO KHOZYAYSTVA in Russian No 12, Dec 85 pp 60-63

[Article by V. Kotelyanets, doctor of economic sciences, Ukrainian Scientific Research Institute of the Economics of the Organization of Agriculture imeni A.G. Shlikhter: "Taking the Transport Factor More Fully Into Consideration"]

[Text] In the shipment of freight in agriculture, as in other sectors of the agrarian-industrial complex [APK], the cost created by the labor of the transport workers is added to the cost of the commodities being transported. Therefore outlays on transport are production costs and are incorporated in the cost of the commodities as part of the social costs of production.

Proceeding from this, consideration of the transport factor in the APK should be based on the fact that the freight-transportation process is an integral part of the production process. Transport, as distinct from other spheres of material production, does not create a product in material-real terms, but the cost of the labor expended on the transportation. The nature of the output of the transport sector should be considered here also. The output of the transport sector is the result of transfer; it is used simultaneously with its production and cannot be accumulated.

In this connection, reflecting the planned improvements in an increase in the volume of transport operations and elaborating measures for an improvement in transport services for the kolkhozes, sovkhoses and other agricultural enterprises, it is essential to implement measures for a further improvement in the location and organization of agricultural production, its concentration and specialization and the inculcation of progressive, less transport-intensive techniques.

Undoubtedly, the increase in the volume of transport operations cannot be braked or brought to a halt altogether since under the conditions of the intensification of the country's economy in general and of agricultural production in particular this is an objective process. Scientific-technical progress is creating the conditions for a further division of labor, increasing the pace of intensification and causing a growth of commodity turnover. The construction of a network of roads and also an increase in the capacity of rolling stock are making it possible to expand interoblast and interzonal transportation.

As a result not only is the overall volume of transportation increasing, the transportation distances are growing also. Thus motor transport of the State Committee for the Supply of Production Equipment for Agriculture [Goskomselkhoztekhnika] performs the centralized transportation of goods and materials for the kolkhozes and sovkhoses and also of their products. Whereas in 1971 motor transport of the Selkhoztekhnika in the Ukrainian SSR transported 136.7 million tons of freight, in 1983 it transported 178.8 million tons or 1.3 times more. And this when the Selkhoztekhnika had handed over to the Selkhozkhimiya transport facilities and large volumes of the shipment of organic and mineral fertilizer.

When the centralized delivery to the kolkhozes and sovkhoses of petroleum products, machinery, equipment, spares, construction materials and other freight had only just begun to be developed in the republic (1966-1970), the average distance of freight shipment by UkSSR Goskomselkhoztekhnika motor transport amounted to 23.5 kilometers. As the various transport services expanded, the transportation distance increased and in the period 1971-1975 amounted to 28.6 kilometers, in 1976-1980 to some 33.5 kilometers and in the period 1981-1983 to 40.4 kilometers or had increased by a factor of 1.7. This increase in the freight-transportation distance is explained by a number of factors.

The transfer of short-range hauling from railroad transport to motor transport has been observed in recent years. Consequently, there is an increase in the volume of transport operations in the delivery of agricultural machinery, equipment and construction materials to the kolkhozes and sovkhoses not from railroad stations but from manufacturer-plants frequently 200-300 kilometers and more away. A similar trend can be traced in the delivery of mineral fertilizer also.

A network of specialized plants and workshops for the maintenance of agricultural equipment was created in the period in question in the Goskomselkhoztekhnika system. And whereas earlier, as a rule, major repairs had been carried out in one's own rayon, currently the tractors, agricultural machinery, components and units are transported not only to other rayons but also to other oblasts over distances sometimes in excess of 300-500 kilometers.

Increased freight turnover in the APK is connected also with the industrialization of construction and the commissioning of house-building works and large-scale interfarm brick and cement plants. All this has led to an increase in the distance of shipping construction materials with a simultaneous increase in volume.

Thus the growth of freight turnover in the APK has been caused by tremendous qualitative changes in the development of the production forces of agriculture and its service sectors, transition to industrial methods and production techniques, extensive development of interfarm cooperation and the expansion of production and socio-cultural construction. Nonetheless, under the conditions of the need for the economical expenditure of all resources fuller consideration of the influence of the transport factor is making it possible to rationalize shipping and reduce the expenditure of labor and resources on transport operations.

In economic literature the transport factor is examined, in the main, at the time of distributing agricultural production. But under the conditions of the intensification and industrialization of production it should, as domestic and foreign experience shows, be taken into consideration more fully in the APK when organizational, technical, production engineering and socioeconomic questions are being decided also.

Naturally, the transport factor should always be taken into consideration with the distribution of agricultural production and the concentration and deepening of its specialization. The economic relations between the producers of agricultural products and the consumers have changed considerably in recent decades as a result of the development of the zonal specialization of agriculture and manufacturing industry. The production structure of agriculture in different zones is the result of the long process of its development in accordance with natural-economic conditions.

Measures pertaining to the distribution of agricultural production are constantly supplemented by an intensification of its specialization and concentration. Significant production concentration measures have been implemented in our country's agriculture. The agricultural enterprises and their production subdivisions have been consolidated and strong new state and interkolkhoz specialized enterprises for the production of animal husbandry and plant-growing products have been created. The concentration of production at increasingly large enterprises has afforded broad opportunities for the introduction of the achievements of scientific-technical progress, which, in turn, is an essential condition for the development of production concentration.

However, the concentration of production in agriculture at increasingly large enterprises or subdivisions thereof (livestock units, brigades, sections) is accompanied, as a rule, by an increase in the distance of the transportation of fodder, fertilizer, seeds and such. Simultaneously there is an increase in the expenditure of labor and resources on transportation, and the need for means of transport outpaces the rate of production concentration.

Therefore when implementing measures for the concentration of agricultural production it is essential to avoid the eccentric distribution of the farm centers and, particularly, the livestock units in relation to the agricultural land whereby there is a considerable increase in the distance of hauling freight and expenditure on its transport.

Together with the optimum location of livestock subdivisions on the territory of the farm, the more intensive introduction of livestock feed crop rotation in and around the farms could moderate the influence of the transport factor at the large-scale livestock farms and complexes. This would make it possible to reduce the distance of the transportation of green bulk.

Inasmuch as the measures for concentrating the herd of animals at units and complexes always leads to an increase in the distances of the transportation of fodder and fertilizer, it is essential also to employ means of transport which correspond to the large scale of production. Unfortunately, this self-evident truth is being taken into consideration insufficiently by agricultural machine building. At large-scale specialized farms and complexes for raising

and fattening cattle in the summer period it is essential to transport hundreds of tons of green bulk. But regardless of the degree of concentration of the livestock herd, 2.5-4.5-ton vehicles and 4-ton tractor trailers, which are not adapted for this, are used almost everywhere. Studies show that together with the 4-ton trailers (with a body of 10 cubic meters) it is essential to manufacture and supply the specialized farms with trailers with a capacity of 8, 12 and 20 tons which may be coupled with MTZ-80 and T-150K tractors.

Technical progress is exerting a marked influence on an improvement in production engineering processes in the plant-growing and animal husbandry sectors whereby the volume and distance of freight transportation can be changed considerably. Experience shows that techniques may be more or less transport-intensive. Thus the preparation of grass meal and granules from annual and perennial grasses and other plants has become widespread in recent years. As a rule, green bulk is conveyed from the field for processing with an 80-percent moisture content. Given the binding of the green bulk and reduction of the moisture content to 40 percent, the need for means of transport for its shipment is halved, and there is an almost proportionate reduction in fuel consumption in processing on AVM-type units. But the production engineers are not doing this, giving as the explanation the fact that carotene is lost upon binding in the sun. Comprehensive studies here aimed at obtaining a high-quality product byway of the use of resource-saving technology are essential. The transport factor is frequently not taken into consideration in trying to improve techniques of animal maintenance at the large-scale units and complexes. Thus the washoff of the manure increases its transportation volume several times over. This technology is employed, as a rule, given a large concentration of the herd. For this reason there is the additional operation of a large number of specialized motor vehicles, liquid manure spreaders and so forth in servicing the large-scale animal husbandry unit or complex. Experience shows that it is more expedient to collect and cart away manure by traditional methods without washoff even on specialized animal husbandry farms and complexes.

Naturally, modern agricultural production is inconceivable without progressive machine technology. But it must be progressive in the full meaning of this word and not solve just one, albeit very important, question. For example, the intensive techniques of sugar beet cultivation based on new, highly productive equipment, which are being introduced quite extensively, make it possible to obtain big harvests, while labor expenditure on the cultivation and harvesting is four-five times less than with traditional methods. It should be emphasized that in the mechanization of beet growing, as, incidentally, in other sectors of agriculture, a tremendous step forward has been taken. Manual labor is being replaced by mechanized labor everywhere. But the creators of the new equipment for the beet growers and the developers of new techniques are paying insufficient attention to reducing the contamination of the raw materials for sugar beet production. In 1961-1965 the contamination of the sugar beet being delivered to the refineries in the UkSSR constituted 4.9 percent, in 1966-1970 8 percent, in 1971-1975 10.9 percent, and in subsequent years it has risen to 12-15 percent. The average distance of the delivery of sugar beets in the republic is 28 kilometers. And 90,000-120,000 tons of earth, after-harvest remnants and weeds, are conveyed per million tons of roots; that is, transport and people's labor are being used unproductively and a large quantity of petroleum products is being burned.



The specific singularities of the harvesting of sugar beets, do not permit the roots to be conveyed from the fields in an absolutely clean condition, but reducing their contamination, if only by half, is extremely necessary. It is necessary to install on the beet combines and beet loaders fans to blow off tiny and medium-sized clumps of earth and dust. Strict compliance with the rules of agrotechnics and the extensive application of herbicides, which makes it possible to prevent a large degree of contamination of the fields by harvesting time, will also contribute to the successful accomplishment of this task.

Economic levers are needed here also. It is advisable to devise a form of material incentive for the machine operators working on combines and beet loaders, the fitters and mechanics responsible for the correct adjustment of the combines and also agronomists to reduce the contamination of the sugar beets being conveyed from the fields to the refineries. In all probability the contamination of the last 3 years should be taken as the reference point.

The struggle against inefficient transportation in agriculture and other sectors of the APK must be conducted comprehensively. And if, for example, measures for reducing the transportation of earth and after-harvest remnants from the fields together with the sugar beet roots are examined, it is essential to provide for an improvement in accounting and accountability on the beet-sowing farms. This is connected with the fact that currently on the kolkhozes and sovkhoses with higher beet contamination the indicators of activity in this sector are higher since yield and prime costs are determined not in accordance with standard but physical weight. It turns out that on the farms which have conveyed more earth and after-harvest remnants together with the roots the yield is higher and prime costs are lower.

Under conditions of complex and large-scale agricultural production much importance is also attached to a further improvement in management of the operation of transport in the rayon agrarian-industrial organization (RAPO).

For the rayon as a whole information concerning freight, its transportation times and freight traffic volume is collated and studied only in the harvesting period for the main types of agricultural product. Such work is not performed throughout the year for the rest of the freight (60-70 percent). Each transport enterprise, truck fleet, garage and so forth plans the operation of motor transport only for its own department or requests received from clients.

There is now an urgent need for uniform traffic-control leadership of the operation of transport in the rayon. Freight-shipment control centers, within whose competence is the organization of transportation and the dispatch of transport both beyond the rayon and, where necessary, to the kolkhozes and sovkhoses, have been set up for this purpose in 1985 under the auspices of the RAPO. This is making it possible to select the means of transport more correctly, preclude the motor vehicles' head-on empty runs, reduce the idling of transport when waiting to be loaded and make more extensive use of automobile trailers.

Considering the presence of experienced personnel, it is expedient to entrust the organization of uniform transportation traffic control within the RAPO to the existing interfarm transport enterprises or the corresponding rayon selkhoztekhnika subdivisions.

The influence of the transport factor in the agricultural production process may also be reduced by the correct choice of transportation, volume of transport operations and class of freight. In the process of the organization of transport operations, particularly in freight-intensive periods, it is very important to determine where and which means of transport may be used the most efficiently. Unfortunately, not all specialists on the kolkhozes and sovkhoses know the fundamentals of the rational operation and organization of the work of transport. For this reason it is advisable in the training of specialists in the VUZ's and tekhnikums and also in the system of APK management personnel and specialist improvement educational institutions to include in the curricula and study programs basic topics pertaining to the operation, organization and economics of transport in agriculture.

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## AGRO-ECONOMICS AND ORGANIZATION

### ESTONIAN AGROPROM ECONOMIC MANAGEMENT DISCUSSED

#### Strengthening of Mechanism

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 12, Dec 85 pp 94-100

[Article by Kh. Repp, candidate of economic sciences: "Experience in Management of the Estonian SSR Agroindustrial Complex"]

[Text] As of 1981, after long-term experiments in Vilyandiskiy and Pyarnuskiy rayons, all administrations of agriculture of rayon executive committees in the Estonian SSR were transformed into fundamentally new bodies--RAPO management systems. The republic's Ministry of Agriculture did not have the capabilities to engage in specific intersectorial management of enterprises and organizations of ministries and departments forming part of the APK, because it could affect through RAPO only kolkhozes, sovkhozes, interfarm agricultural enterprises and some interr rayon and republic agricultural organizations subordinate to it.

This did not ensure an efficient management of enterprises servicing kolkhozes and sovkhozes and hampered the planning, financing and material and technical supply for agriculture and the agroindustrial complex in the republic as a whole. The interests of agroindustrial production required the attainment of a new stage in integration with the utilization of RAPO experience.

The plan of the Estonian SSR Agroindustrial Association (Agroprom ESSR) was prepared in 1982. At the same time, a decision on the establishment of the State Committee for Agricultural Production, basically, similar in its content and tasks to Agroprom ESSR, was adopted in the Georgian SSR.

The Ministry of Agriculture (including the Estonian Scientific Production Association for Agrochemical Services to Agriculture and the Estonian Administration of the Poultry Raising Industry), the State Committee for Supply of Production Equipment for Agriculture and the State Committee for Land Reclamation and Water Resources were abolished in early 1983 and Agroprom was established on their basis. The central machinery of Agroprom, as compared with the abolished machinery of three ministries and departments, was reduced by 74 people, or 12 percent, and the number of structural subdivisions, by 26 units. The annual savings of the wage fund totaled 133,000 rubles.

Agroprom was entrusted with the task of creating stable economic conditions for the following: successful fulfillment of the country's Food Program, ensuring an efficient activity of rayon agroindustrial associations and further development of the agroindustrial complex as a whole; fulfillment by kolkhozes, sovkhozes and other state enterprises of Agroprom of plans for the production and state purchases of agricultural products; cost accounting activity of kolkhozes, sovkhozes and other state agricultural enterprises through an enhancement of the role of economic methods of management, equalization of economic conditions of management and improvement in planning, material incentives and contractual relations; material and technical supply on a high level of production services for kolkhozes, sovkhozes and other enterprises and organizations of the republic's APK; introduction of the achievements of science, technology and advanced experience into production and organization of the development and practical realization of overall goal-oriented programs for the acceleration of scientific and technical progress in the APK; scientific organization of labor and management and provision of the Agroprom system with skilled personnel; constant improvement in the economic mechanism and in production and economic relations between the enterprises and organizations of Agroprom and the enterprises of other sectors of the republic's APK and determination of the conditions of evaluation and stimulation of economic activity; implementation of measures for the further improvement in housing, municipal-general and social-cultural living conditions of the rural population, as well as trade services and public dining, and establishment of a modern infrastructure in rural areas. Agroprom also supervises land use and protection and the fulfillment of measures for the development of pedigree stockbreeding, plant protection, agrochemical services for farms, veterinary control, inspection of the state of the machine and tractor pool and so forth.

In the central machinery of Agroprom there are structural subdivisions engaged in the planning and management of agricultural production, material and technical supply, chemicalization, land reclamation, production and technical support and rural construction, as well as in the coordination of the activity of sectorial ministries and departments and in supervision.

The main economic planning administration, main administrations of bookkeeping and reporting and of labor and wages, the financial administration, the main administration of science, the administration of propaganda and subordinate services (economic) engage in economic work. The number of workers of all these services makes up 18 percent of the total Agroprom staff. The unification of economic services of the abolished ministries and departments has made it possible to reduce about 30 official units and, what is most important, to manage all economic and planning work overally under the guidance of the first deputy chairman of Agroprom.

The management of Agroprom activity and an efficient coordination of the work of basic links of the republic's APK are carried out by the Presidium (16 people) headed by the chairman of Agroprom, who, at the same time, is first deputy chairman of the Estonian SSR Council of Ministers. The chairman organizes general work, is personally responsible for the fulfillment of the tasks and duties entrusted to Agroprom, organizes the work of its deputies and



chiefs of structural subdivisions of the central machinery connected with the management of the activity of enterprises, institutions and organizations of the Agroprom system and performs other general management functions.

The presidium promptly examines problems concerning the course of procurements and deliveries to all-Union and republic stocks and an increase in the production and a complete sale of the products of agriculture and food industry sectors, takes measures to fulfill the established plans and assignments, distributes the allocated material and technical resources among ministries and departments of the republic's APK, as well as among RAPO, discusses proposals on an improvement in the economic mechanism and so forth. As a rule, the presidium's meetings are held twice a month.

An Agroprom council (56 people) was established for the general management of the republic's APK, solution of long-term problems concerning the development of its sectors, mobilization of efforts for a fuller utilization of resources, growth of the volumes of the production, purchases and processing of products and improvement in their quality. It unifies the key workers of Agroprom, ministries, departments and RAPO, as well as other major organizations forming part of the APK, or servicing it. The chairman of Agroprom is also the council chairman.

For the purpose of realizing functions connected with the necessary redistribution of the capital of enterprises and organizations of the republic's APK operating under unequal conditions of management, according to the approved statute, the following centralized funds were created in Agroprom: for production development, social-cultural measures and housing construction, material incentives and so forth. Centralized funds are created from the deductions of the enterprises of both Agroprom organizations and other organizations and enterprises of the republic's APK. The amount (norm) of deductions for enterprises and organizations is determined at a meeting of the Agroprom council in a differentiated manner with due regard for objective conditions of management.

The capital of the centralized production development fund is used for the realization of goal-oriented overall programs and other measures of fundamental importance for the republic's APK as a whole; introduction of new technology; financing of capital construction and repairs; acceleration of the development of lagging APK sectors and financing of other necessary measures connected with the strengthening of the material and technical base.

The centralized fund for social-cultural measures and housing construction was created for expanding and repairing available housing, improving workers' medical services and way of life and developing physical culture and sport.

The centralized material incentive fund is intended primarily for awarding bonuses to winners in the socialist competition of enterprises, institutions and organizations for outstanding achievements in the development of the republic's APK. Bonuses are awarded to collectives actively engaged in the realization of tasks important for the APK. Workers of the central machinery of Agroprom are also rewarded for an overfulfillment of annual assignments from the capital of this fund.

Thus, in 1984 deductions into the centralized material incentive fund of Agroprom totaled 1,526,000 rubles (of which 1,023,000 rubles, or 67 percent, from RAPO and enterprises directly subordinate to Agroprom) and into the fund for social and cultural measures and housing construction, 1,004,000 rubles (632,000 rubles, or 63 percent respectively). This capital was distributed by Agroprom to different organizations and enterprises of the republic's APK objectively needing this support.

Centralized funds are now created basically from RAPO deductions. Organizations and enterprises of other APK ministries and departments have not yet made deductions, mainly, for departmental considerations.

Centralized funds of rayon agroindustrial associations in the Estonian SSR, in contrast to other Union republics, are formed from the centralized part (up to 10 percent) of the planned profit of sovkhozes and the net income of kolkhozes. In the Estonian SSR the wages and bonuses of workers in the RAPO management system (with 20 to 65 people) are paid in accordance with the procedure established for sovkhoz trusts. The maintenance of this system is cost accounting.

Almost 3 years have passed from the day of formation in the Estonian SSR of Agroprom and more than 4 years, of RAPO in all rayons. What has changed in the work of management bodies and in the activity of integrated economic organizations? The joint work of all APK sectors and links has improved, noncorrespondence of the organizational structure of management between rayon and republic links has been basically eliminated, favorable conditions for an efficient combination of territorial, sectorial and intersectorial principles of management have been created, the redistribution function of management bodies with respect to the funds and capital of economic organizations and enterprises has been strengthened and expenditures on management and planning have been reduced considerably. The proportion of workers in the management system in the total number of workers in the republic's agriculture decreases constantly. It is much lower than in industry. For example, in 1984 this indicator comprised 9.6 percent in agriculture and 13.5 percent in industry.

The new management and planning system has made it possible to change over to unified plans, which have been established by the Agroprom council, for the purchase of agricultural products and limits of material and technical resources for RAPO, which distribute them among kolkhozes, sovkhozes and the individual sector, examine them at councils of associations and submit them to rayon executive committees for approval. Plans for deliveries of specialized equipment are presented directly to agricultural service enterprises. Since the profitability of services and jobs at agricultural service enterprises does not exceed 4 to 5 percent (with standards of 8 percent), Agroprom has not introduced changes in the existing rates and prices of these jobs.

The formation of RAPO and Agroprom has made it possible to improve engineering, land reclamation, agrochemical and transport services for kolkhozes and sovkhozes. The organizations of the Agricultural Equipment Association, of the Scientific Production Association for Agrochemical Services to Agriculture and of land reclamation previously existing in rayons

have now been combined into unified agricultural service enterprises on the basis of the associations of the former Rayon Agricultural Equipment Association. All the functions concerning production and technical support for kolkhozes and sovkhoses have been entrusted to them. With respect to problems connected with the repair and technical servicing of the machine and tractor pool, electrical engineering equipment and mechanisms and equipment in animal husbandry, with agrochemical and land reclamation work, with centralized transport and with material and technical supply, kolkhozes and sovkhoses now turn only to one organization--the overall agricultural service enterprise subordinate only to RAPO, which is a structural subdivision of RAPO and a partner of kolkhozes and sovkhoses. This has made it possible to regulate the economic relations of all enterprises within RAPO connected with the agricultural activity as a whole, although, in practice, some instructions, statutes and indicators in effect in Union ministries and departments as yet do not correspond to this procedure.

Parallelism and duplication in the work of engineering and technical services of kolkhozes, sovkhoses, the agricultural service enterprise and the RAPO system are being eliminated. Their functions have been delimited by special documents. The engineering and technical service of RAPO is entrusted with the development of basic directions in the overall mechanization and electrification of agricultural enterprises, introduction of new equipment and advanced technology of performance of mechanized operations, organization of the training of and improvement in the skills of machine operating personnel and distribution of material resources. The agricultural service enterprise (association) of RAPO is responsible for ensuring the required availability of machinery, equipment and transport facilities on kolkhozes and sovkhoses according to appropriate contracts; their regular supply with spare parts and repair materials; organization of the technical servicing and repair of equipment of agricultural enterprises (but only if the performance of these operations by farms is not advisable economically); installation of new equipment on animal husbandry farms; performance of agrochemical, land reclamation and other necessary operations according to farm orders and plans approved by the RAPO council.

Under the new conditions functions that the farms themselves cannot perform are reserved for service organizations. Previously, every APK partner established its own separate material and technical base. Now it is possible to establish unified motor pools, warehouses and auxiliary services for all APK partners.

The organization of the land reclamation and water resources service has improved considerably. For example, whereas, previously, reclamation work in the republic was handled by two departments (the presently abolished State Committee of Land Reclamation and Water Resources, under the authority of which were rayon and interrayon administrations of land reclamation performing the functions of the client of reclamation construction and certain operations connected with the repair of existing reclamation systems, and the State Committee for Supply of Production Equipment for Agriculture, whose enterprises carried out the basic volume of reclamation work in the republic), now there is the Main Administration of Land Reclamation of the Estonian SSR Agroprom, which manages all land reclamation work in the republic. At the

rayon level the entire land reclamation service forms part of the unified agricultural service enterprise (on the basis of the former Rayon Agricultural Equipment Association) and is subordinate only to RAPO. The management of all land reclamation work has become much simpler and the volume of paper work has been reduced several-fold.

The presidium and council of the republic's Agroprom solve many intersectorial problems previously solved at the Estonian SSR Council of Ministers; for example, problems of assigning manpower to meat combines during the most stepped-up period (January 1985), to kolkhozes and sovkhoses during the harvest period and to enterprises of the Estonian SSR Ministry of Procurement for the preparation of the material and technical base for a mass procurement of agricultural products.

Owing to the absence of departmental barriers, in Agroprom there are new opportunities to improve the utilization of cadres of machine operators and land reclamation specialists. During the time free of their immediate jobs machine operators on kolkhozes and sovkhoses help land reclamation specialists and the latter help the former in sowing and harvesting operations. The performance of land reclamation work by the common efforts of farms and special subdivisions of the Rayon Agricultural Service Association is very important. The land reclamation program of the Estonian SSR envisages the transformation of large areas, that is, the drainage during the 12th Five-Year Plan of 85,000 hectares and soil improvement operations on 12,000 hectares for the purpose of obtaining in 1990 a total of 790,000 tons of grain (50 percent of the total volume of grain produced in the republic) and feed in the volume of 1.11 million tons of feed units.

In connection with the allocation of limits of capital investments for kolkhozes, sovkhoses and agricultural service enterprises the planning and construction of projects for production and social-cultural purposes, as well as of housing projects, have improved. The establishment of unified bodies for the management of construction and of the development of the infrastructure in the form of main administrations of capital construction and of power engineering and electrification, the administration for social problems and others under the guidance of the deputy chairman of Agroprom and the improvement in the planning system make it possible to develop construction, the power system and the social infrastructure in rural areas more efficiently.

Estonia does not have a ministry of rural construction, or a "selkhozenergo" system, and the republic cost accounting association Estkolkhozstroy is the main contractor for capital construction in the APK. Management and control of the activity of Estkolkhozstroy have also been entrusted to Agroprom, which coordinates and supervises the performance of contract construction and power engineering work and at the base of its planning organizations carries out all planning work.

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1. B. Saul, "Acceleration of Scientific and Technical Development," SOTSIALISTLIK PYLLUMAYANDUS, 1985, No 16, p 2.



The capital investments of the "agriculture" sector are allocated to Agroprom and it establishes the priority of their utilization. Agroprom is the holder of stocks of building materials for the volume of work performed by its constituent farms and organizations. The plan for construction and installation work of the Rayon Agricultural Service Association is formed under RAPO management on the basis of specific needs of farms. Material resources for planned assignments are allocated directly to the Agricultural Service Association (previously through farms). The enlistment of interrayon repair, as well as republic industrial, enterprises of Agroprom in the manufacture of nonstandard equipment and structures necessary for the performance of the APK construction program has increased considerably.

Thus, the distribution of limits of capital investments and material-technical and other resources among APK sectors is made by Agroprom in the course of planning with respect to its constituent organizations and enterprises. The redistribution of limits occurs only in exceptional cases.

The integration of the management of agriculture and of the sectors servicing it in the republic is the basic qualitative reorganization of production and technical services for farms. For example, in 1983-1984 the republic's farms reduced the idle time of the machine pool owing to technical malfunctions, the quality of equipment for kolkhozes and sovkhoses repaired at specialized enterprises improved and the number of major repairs of tractors and grain harvesting combines decreased. In 1983-1984 the availability of tractors, trucks and grain harvesting combines of farms for seasonal work was at the level of the set assignments. The average daily output per standard tractor was 9.7 and 9.9 hectares in 1983-1984, as compared with 9.5 hectares in 1982. When repair volumes decreased, the daily productivity per tractor and output per machine operator increased. Many power resources were also saved (for example, up to 20 percent in Vyruskiy Rayon).

The production and procurement of agricultural products increased significantly and the economic indicators of farm activity improved as a result of the refinement in the system of management and in the entire economic mechanism of the APK and of the increase in the material interest of workers at enterprises, organizations and management bodies.

In the republic's public sector gross agricultural output in comparable prices in 1983-1984, as compared with 1981-1982, increased by 18.2 percent, including the output of grain, by 13 percent, of potatoes, by 18 percent and of milk, by 8.4 percent. In 1983-1984, as compared with previous years, the yield of most agricultural crops and the productivity of animals increased significantly, that is, of grain, by 16 percent and of potatoes, by 32 percent; milk yield per cow, by 10.1 percent; average daily weight gain in cattle, by 6 percent and in hogs, by 20.8 percent. Plant growing and animal husbandry developed in an especially intensive manner in 1984. The average yield of grain crops per hectare was 30 quintals, of potatoes, 187 quintals and of perennial grass hay, 47 quintals.

The productivity of livestock increased considerably in 1983-1985. In 1984 the average milk yield per cow on kolkhozes and sovkhoses totaled 3,855 kg, or 154 kg more than in 1983. The task of increasing the average milk yield per

cow to 4,000 kg during the concluding year of the five-year plan is being accomplished successfully. In 1984 the average daily weight gain in fattening cattle totaled 607 grams and in hogs, 468 grams and the average sale weight of cattle, 435 kg and of hogs, 108 kg. All farms had a profitability level of more than 30 percent.

During an evaluation of the results of activity and socialist competition of all farms and RAPO a special indicator--"coefficient of management efficiency"--has been applied in the Estonian SSR for a number of years. The calculation of this coefficient with due regard for the agro-economic potential of every farm is performed on a computer.

Social problems are also being solved. The migratory process of manpower to cities in the republic ceased in 1984. At present a reverse process has emerged--people leave for permanent work for kolkhozes, sovkhoses and other RAPO enterprises. On sovkhoses, kolkhozes and repair enterprises of the republic's agricultural services average monthly wages together with paid bonuses totaled more than 230 to 250 rubles in 1984.

For the attainment of high results in the all-Union socialist competition and for the successful fulfillment of the State Plan for the Economic and Social Development of the USSR for 1984 the Estonian SSR was awarded the Challenge Red Banner of the CPSU Central Committee, the USSR Council of Ministers, the AUCCTU and the Central Committee of the Komsomol. The new system of organization and management of agriculture and the establishment of RAPO and Agroprom greatly contributed to this.

Examining the activity of Agroprom in 3 years and of RAPO in 10 years, on the whole, it must be noted that there is a need for a further serious concentration of efforts on the part of the central machinery of Agroprom and of the RAPO management system, as well as of planning, financial and other functional and sectorial bodies in the republic, on the solution of long-term problems of agroindustrial reproduction for the final results of the production of labor collectives of the APK and their orientation toward meeting the needs of consumers of agricultural products with a minimum of expenditures.

Agroprom, as the unified body of management of the republic's APK, in appropriate functions is directly subordinate to several Union ministries and departments. As a result, the central machinery of Agroprom was overloaded with administrative information. For example, in 1984 the central machinery of Agroprom received from the indicated ministries and departments more than 3,000 different directives, orders and official letters and instructions. Decentralization of operational management, reduction in the volumes of accounting and reporting information and optimization of the size of the managerial staff at all levels are necessary. It is advisable to delimit the functions of Union and republic APK management bodies.

Problems concerning the planning of the activity of individual groups of Agroprom enterprises have not been solved. For example, on sovkhoses the profit and the wage fund are planned according to the economic activity as a whole and for agricultural service enterprises (the former Agricultural

Equipment Association), according to types of activity. The economic mechanism of Agroprom has not yet been perfected fully. There is no unified plan for APK development and the departmental approach on the part of a number of APK sectors and full cost accounting in all APK links have not yet been eliminated.

The planning, financing, material and technical supply and sale of products of agroindustrial production still take place to a significant extent on a departmental level. The republic's Ministry of Procurement and the Estonian Union of Consumer Cooperatives form part of the Agroprom council and interact with RAPO and with collective APK management bodies. Often, however, when activity plans are drawn up, bypassing them, they turn to their Union departmental subdivisions, proceeding from departmental interests. Thus, for this reason serious difficulties with the sale of a high potato harvest, as well as of the livestock of enterprises and subsidiary farms, occurred in 1984. The lack of a unified system of material and technical supply for the country's APK has led to the fact that in the central machinery of Agroprom five or six subdivisions handle these problems to one extent or another. Relations between Agroprom and Union ministries and departments must be built on a firm scientifically substantiated standard basis.

The organizational structure of RAPO and Agroprom in the republic requires further improvement. It should fully meet the interests of unified agricultural production. It is also advisable to include enterprises engaged in the procurement and initial processing of agricultural raw materials and products (livestock, poultry, grain for fodder, potatoes, flax, fruits and vegetables) directly in the RAPO structure and in accordance with this to introduce changes in the structure and staffs of bodies managing these enterprises and organizations.

In our opinion, existing forms of annual production and financial plans of the republic's kolkhozes and sovkhoses have too many planned indicators. For example, in the draft plan for 1986 there are more than 19,000 indicators. It is advisable to develop and approve new forms of the indicated plan with a reduction in the number of indicators.

Unsolved problems are perceptible when the balance of fodder resources and beef and poultry production is drawn. For example, January-February, not December, is the concluding period of the maximum production of pork during the agricultural year, that is, the planned calendar and agricultural years do not coincide. Therefore, in our opinion, it is advisable, beginning in the 12th Five-Year Plan, to sell livestock and poultry at the expense of the next year's plan. Agricultural products produced on citizens' subsidiary farms and sold through kolkhozes and sovkhoses on the basis of long-term contracts should be taken into account in the corresponding planning and report indicators of these farms and citizens' subsidiary farms should be helped with building materials and film for hothouses. However, for this the Estonian SSR Gosplan should have appropriate funds at its disposal.

Estonia's kolkhozes and sovkhoses, which have soil differing in fertility, in nonconnection with specialization in the production of products receive income from their sale and material and technical resources from the state not in

equal measure, despite the same expended live labor. For an equalization of the conditions of management and a partial redistribution of the differentiated additional income of many farms received owing to the most favorable soil and other factors it is necessary to form a centralized fund for the economic stimulation and regulation of Agroprom prices. First of all, part of the centralized profit of RAPO, as well as the difference in sums formed between the sum received for exceeding the level of increases (50 percent) in the prices of agricultural products set by the state during the 10th Five-Year Plan and similar increases (50 percent) for exceeding the level of this indicators during the 11th Five-Year Plan, can be its sources. This difference in sums in the republic, for example, in 1986 can total more than 65 million rubles.

It is necessary to differentiate the rates of payments to the budget depending on the agro-economic potential of each specific farm and to establish them for all agricultural enterprises depending on the qualitative evaluation of land and the value of fixed capital.

In our opinion, it is advisable not to establish a norm of profit (now comprising 8 percent) for jobs and services performed by agricultural service enterprises (the former Agricultural Equipment Association) for kolkhozes and sovkhoses. Profit should be formed only at the expense of industrial products produced by these enterprises and the savings of expenditures, as compared with approved standards, should be transferred to the material incentive fund.

For the purpose of fully eliminating departmental interests, sharply reducing the volumes of major repairs and substantially saving spare parts of agricultural equipment it is necessary to exclude the volumes of repair operations from the recording of industrial output of agricultural service enterprises and to change over from the planning and recording of the activity of these enterprises according to value indicators to the standard method according to expenditures of live labor.

In Estonia, where a procedure of transfer of up to 10 percent of the planned profit of sovkhoses and of the net income of kolkhozes to centralized funds of RAPO was established in all rayons in 1981, it is advisable to retain this procedure, despite the fact that, according to the Standard Statute of RAPO approved in 1982, centralized funds are created by RAPO members only from similar funds. The application of such a method of formation of centralized funds would have a negative effect on the economic results of RAPO members.

For the purpose of intensifying the cost accounting activity of Estonia's agricultural enterprises and increasing the final results of work, in our opinion, it is necessary to change over in them to a unified system of formation of the wage fund (including all types of wages and bonuses) according to stable standards establishing a dependence of the increase in the wage fund on the increase in cost-accounting gross income (after deductions of unearned income tax and interest on credit) per worker.

Taking into consideration difficulties with the provision of personnel, it is desirable, on an experimental basis, to give the republic's kolkhozes and sovkhoses the opportunity to enlist workers and employees of other



enterprises, institutions and organizations in work on the basis of an agricultural contract and under conditions envisaged for individuals holding several jobs before and after lessons.

It is necessary to regulate the wages of workers of the central machinery of Agroprom, RAPO farms and agricultural service enterprises, establishing salaries for workers in the management system and in management bodies depending on the complexity and responsibility of performed jobs, and to make material incentives for key workers and specialists of APK ministries and departments from the centralized material incentive fund of Agroprom dependent on the final results of activity of the republic's APK as a whole.

The level of organization of management and the efficiency of effect of the economic mechanism on an improvement in the results of activity of the republic's APK as yet do not meet present requirements. Basic measures contributing to the most complete fulfillment by Agroprom of the tasks entrusted to it includes a planned improvement in management on the basis of information computer support and computerization of agroindustrial production at all levels of management within the framework of the unified economic APK mechanism. This measure can contribute to an increase in output.

The new system of APK planning and management requires new methods and techniques of personnel work, primarily in the central machinery of Agroprom. Its individual subdivisions should eliminate their narrow departmental approach when solving problems on the entire APK scale. The entire system of training APK personnel, primarily managers and specialists on all levels, must be improved. High-level knowledge and ability to efficiently work under the new conditions of agroindustrial production in accordance with the decree of the CPSU Central Committee and the USSR Council of Ministers "On Further Improving the Management of the Agroindustrial Complex" are needed.

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Bronshteyn on Pricing

Moscow IZVESTIYA in Russian 7 Jan 86 p 2

[Article: "We Must Change Over to Single-Level Prices"]

[Text] "New APK structural administrations at all levels will have to master economic levers of planned regulation in accordance with the demands of the time"-- M. BRONSHTEYN, corresponding member of Estonia's Academy of Sciences.

Organizational structures of management of the country's agroindustrial complex are now being reconstructed. Of course, this, as well as the adjustment of the economic mechanism, will require time. It is a question of creating economic conditions, which would stimulate all APK components to search for and realize solutions most efficient for society. New structural APK administrations at all levels will have to master economic levers of planned regulation in accordance with the demands of the time.

The May (1982) Plenum of the CPSU Central Committee created favorable economic conditions for an efficient development on a planned cost accounting basis of all APK sectors and economic links of the country as a whole. This also presupposes a fuller consideration of the specific natural-economic features of every region and the appropriate readjustment of economic levers and incentives in localities. In our opinion, the latter is possible only when centralized economic regulation funds are established within the framework of the republic (oblast) APK.

In this connection we would like to examine some problems concerning the further improvement in the work of the republic's APK, primarily the improvement in methods of economic regulation.

The acceleration of scientific and technical progress and the establishment and rapid introduction of fundamentally new and highly efficient technical and technological solutions in the production, storage and processing of agricultural products--this is now the main task. It cannot be accomplished only on the basis of a narrow departmental approach with an orientation toward sectorial, not final, criteria of efficiency.

In our opinion, intersectorial scientific-engineering and introduction centers and flexible (for the time of performance of a given task) collectives of developers and introducers formed on a cost accounting basis with substantial material incentives for the most efficient solutions could greatly help the acceleration of scientific and technical progress within the framework of the ESSR Agroprom. The experience of a number of socialist countries in partial state financing (subsidizing) of the development and introduction of new technical and technological solutions also deserves attention here. Usually, the amounts of these subsidies are differentiated (from 20 to 50 percent of the expenditures) and are given on a competitive basis for the most efficient projects and developments. We assume that the organization of an appropriate specific-purpose fund within the framework of the ESSR Agroprom would make it possible to accelerate scientific and technical progress in the republic's APK, which is now extremely important.

The creation of the most favorable economic conditions for a more efficient placement of agricultural production and a fuller utilization of the natural-economic potential is another problem. According to estimates by specialists, this will make it possible to increase the effectiveness of investments by 20 to 25 percent.

For example, the natural-economic potential of our republic is suited primarily for the development of dairy and beef cattle raising. The natural structure of the fodder base, the need to improve land fertility through an increase in the application of organic fertilizers and existing historical experience in farming correspond to this. However, with the existing ratio of purchase prices the development of hog breeding, basically with purchased feed, is the most profitable. It gives a profit per unit of total investments three to four times greater as compared with dairy and beef cattle raising.

With the existing ratio of purchase prices flax and potato production is not sufficiently profitable economically. To obtain high-quality products and to

store them, substantial additional expenditures are needed. It is not accidental that relatively low rates of development, a deterioration in the quality of products and big losses are observed in these sectors. Flax and potato production has to be imposed on farms by administrative methods.

How to avoid this? Of course, prices and their ratio are of decisive importance. However, the USSR State Committee on Prices and other central bodies can hardly develop for all types of agricultural products an optimum ratio of purchase prices for any region in the country. Moreover, this is not necessary. It is important that the general level of purchase prices covers socially necessary expenditures and ensures a normal process of reproduction in one region or another. Then it is possible to internally readjust the ratio of prices by the method of discounts on highly profitable types of products and markups on low-profitable ones with the appropriate centralized fund for correcting the ratio of purchase prices.

In the republic there is still the problem of economic compensation for production under objectively worse natural-economic conditions in a number of rayons and farms. Even after the introduction of purchase price markups for unprofitable and low-profitable farms there are still big gaps in income resulting from differences in the quality and location of land, capital equipment and the production and social-general building of farms. For example, according to standard evaluations of resource potentials at the same level of management gaps in the income (amount of profit) throughout the republic's rayons with better and worse objective conditions reach 200 percent and throughout extreme groups of farms, 400 to 500 percent. Inside rayons a certain readjustment is now made at the expense of RAPO funds. However, precisely in rayons with relatively worse conditions (Vyruskiy, Valgaskiy, Kingiseppskiy and Khaapsaluskiy) there are the most limited opportunities for the creation of such centralized funds. Here their sizes are several times smaller than in RAPO with the best natural-economic conditions.

We see the solution of this problem in the creation of a special equalization fund at a republic (oblast) level, from which rayons and farms with an evaluation of resource potentials below the average republic (oblast) level would annually receive, provided they fulfill planned deliveries, firm financial compensations. In essence, this is the same purchase price increment for low-profitable farms, but given on a firm standard basis (compensating for worse objective conditions, not for a low level of management) and more flexibly utilized by RAPO during the implementation of overall measures for pulling up lagging farms.

The further enhancement of the role of economic methods and standards of planned management envisaged in preCongress documents is connected with the solution of a number of fundamental problems; first of all, a systematic implementation of socialist criteria and principles of evaluation and stimulation of the results of economic and labor activity. The fullest satisfaction of society's needs with the smallest expenditures of all types of resources is the basic criterion of evaluation of activity. Remuneration "according to labor" is the basic principle. However, are these basic criteria and principles always embedded with sufficient consistency in individual elements of the economic mechanism?

The price is the most important economic lever and standard. The draft of the new edition of the CPSU Program stresses the need for improving price formation "so that prices may more accurately reflect the level of socially necessary expenditures, as well as the quality of products and services..." Such an approach will contribute to the introduction of scientific and technical progress and resource saving technologies. However, in real practice the price often performs other functions and ceases to be a reliable guideline and incentive in progress. We will cite an example with existing (50 percent) purchase price markups on agricultural products. Previously, they were given for an overfulfillment of planned assignments (stimulating the striving to obtain an understated plan and an overstated resource) and now, for exceeding the average rates of growth during the preceding five-year plan. The idea is seemingly good: The acceleration of rates is the most important strategic task.

However, what happens in reality? We will cite an example of our republic (perhaps of others as well). A high-level intensity of the production of basic agricultural products, that is, meat and milk, with expenditures of labor and resources per unit of output relatively the lowest in the country was attained during the past five-year plan. Incidentally, this is also the result of the economic experiments conducted in the republic. However, it is more difficult and more expensive to ensure high rates of increase in milk yields of 4,000 kg per cow (the republic as a whole attained this indicator in 1985) than to increase milk yield from 2,500 kg. Accordingly, on the basis of available calculations, increments for rates of growth will decrease by 60 to 70 million rubles annually during the 12th Five-Year Plan. In essence, the average sale price will drop sharply and the republic's farms will be economically "punished" for a high-level intensity and efficiency of production and normal possibilities for the creation of centralized economic regulation funds discussed above will be ruled out. An especially difficult financial situation can be created during years unfavorable with respect to climatic conditions. The manager involuntarily draws the following conclusion: If you want to receive more from the state and to live well, do not rush to go all out. This is the paradox.

A changeover to single-level prices, which takes into account socially necessary expenditures and the quality of agricultural products and stimulates the levels and efficiency of production respectively, as well as its more efficient placement throughout natural-economic zones, seems to us a radical solution of this problem. At the same time, society can and should compensate for unfavorable natural-economic conditions and not for a low level of management. Under present conditions, taking into consideration the difficulties in radical reorganizations of the system of prices and payments, it would be advisable to include price markups (according to the level formed by the end of the 11th Five-Year Plan) in the basic purchase price, making it a reliable economic guideline and incentive in an increase in the efficiency of utilization of the existing resource potential, which, ultimately, determines the economic possibilities of acceleration of the rates of growth.

This provision should be recorded in Basic Directions in the Economic and Social Development of the USSR for 1986-1990 and for the Period Until the Year 2000.

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AGRO-ECONOMICS AND ORGANIZATION

ECONOMIST ADVISES STRENGTHENING OF AGROPROM ENTERPRISES

Moscow TRUD in Russian 18 Jan 86 p 2

[Article by V. Kiselev, doctor of economic sciences: "The Agroprom [Agroindustrial Association] and Cost Accounting"]

[Text] The letter of V. Perebiynos, chairman of Ukraina Kolkhoz of Novomoskovskiy Rayon, Dnepropetrovsk Oblast ("The Ruble Must Work," 29 Nov 85), which was published as part of an evaluation of the draft of the Basic Directions, proposed that this document include a resolution on the preeminent right of economically-strong enterprises to receive resources for their development. The idea that only the strong should become stronger was not felt to be completely justified by A. Svitchenko, first secretary of the Dovolenskiy Rayon CPSU committee of Novosibirsk Oblast ("Exacting aid," 11 Dec 85). Today V. Kiselev will continue the discussion about this problem, which, judging by our mail, is upsetting to many.

It is well known that among kolkhozes there is a considerable number of millionaire-enterprises, and there are also chronic debtors, existing for decades on state subsidies. In no way can this be explained by different soil-climatic conditions--strong and weak kolkhozes exist in every zone and even in every rayon of the country. If we ask directors of lagging enterprises what interfered with their achieving high production indicators they will give dozens and even hundreds of reasons. But three factors will always be brought up.

The first factor is cadres. There is a shortage of people in many rural regions, young people are often drawn to the city and machine operators who are trained for agriculture settle in industry in large numbers. The shortage of labor resources is exacerbated by poor economic stimuli.

The second factor is the material-technical base. In many enterprises it leaves something to be desired--complete sets of the necessary equipment are absent. Prices for agricultural equipment are growing more rapidly than the equipment's productivity and the cost of maintaining machines in working order is growing even more rapidly than their cost. If this is so, material expenditures grow at a rate greater than that of labor productivity.

The third factor is economic dependence. I will explain what this means. Many types of work--technological repair, chemicalization, irrigation--are carried out in kolkhozes and sovkhozes by specialized subdivisions, the capacities of which are still inadequate to complete all operations within the optimal time. This kind of deficit allows them to dictate their conditions--a regimen convenient to them, volume, schedule, nomenclature and even the cost of their work.

After the May 1982 plenum of the party's central committee a great deal was done to eliminate negative factors of this kind. However, there are also unsolved questions. I will anticipate a question: How did leading enterprises achieve excellent results? My answer is that this was the result of their ability to eliminate unfavorable factors. The paths toward this were very different, but in all cases an essential condition was an authoritative, not only in his kolkhoz but also beyond its confines, energetic and knowledgeable chairman who has proven himself well, who not only does not need prompting and surveillance but who does not tolerate them either. Even today the successes of kolkhoz directors are often determined by their ability to "beat out," "break through" or "obtain." A significant portion of the energy and time of directors is expended precisely on this and not on organization.

Must we mention that under contemporary conditions this type of management style is unacceptable? To significantly raise the effectiveness of production it is essential to take all measures to ensure that not only is useful initiative rewarded but that the opportunities to implement it are expanded and, on the contrary, that passivity is punished. The economic mechanism, the general conception of which is presented in the draft of the Basic Directions, orients us precisely towards this. Within the framework of the agroindustrial complex it is considered important to single out and develop its individual elements.

Above all it is essential to strengthen the economic keys in production management, to realistically expand economic independence and to strengthen orientation toward the end result. Economic stimuli must inspire labor collectives to achieve great successes with the smallest number of people and material-technical resources under any weather conditions.

Finally, the preeminent possibilities for developing and expanding production as well as for replenishing the material-technical base must be given to enterprises in which the return on 1 ruble of supplementary expenditures is maximal.

With the creation of a single management organ for agroindustrial production problem solving has become simplified. Nevertheless, for this we must restructure the economic mechanism in relation to new conditions. For example, how should wage funds and production development funds be formed in enterprises? In our opinion, they represent the remainder of gross receipts obtained from the sale of products after compensation for material expenditures, established deductions to the state, credit and interest payments, the payment of fines and other obligatory payments.

A fixed portion of these resources remains in the rayon agroindustrial association for paying wages to management workers (in this way a direct relationship will be established between their bonuses and the effectiveness of work of all subdivisions in the association), for the development of common services, for the elimination of problem areas and for the implementation of measures affecting the rayon in general. The rest will be used to develop production development funds in individual enterprises and for additional wages, which will be distributed in proportion to the contribution of each subdivision (and within them--of each worker) toward the end result. The size of this contribution can be determined by the RAPO council.

This form of cost accounting presupposes strict financial discipline, closes all holes into government pockets and leaves a single source for monetary resources--the sale of products and a decrease in one's own expenditures. This develops the free interest of all RAPC subdivisions without exception in raising the productivity of fields and livestock, in curtailing losses, in decreasing labor intensiveness and in the efficient use of all types of resources. The RAPO will receive the plan assignments and all material-technical supplies. The association's council will begin to distribute them with the intention of producing a maximal return per unit of resources. In this way the fallacious practice of material-technical supply "to everyone and his brother" is halted and resources are concentrated on those directions which yield the greatest return.

Of course for skilful management it is essential to consider the increase in prices for production means as well as the dependence of the harvest on weather conditions. In particular, there should be a periodic reexamination of procurement prices and they should be brought into line with the cost of machinery and with the advantageous effect of using this machinery. As for weather conditions, let us remember that procurement prices are established according to average productivity levels. This is why during favorable years profits will grow considerably and during unfavorable years they will drop. It would be expedient to create a centralized insurance fund within the RAPO for the purpose of paying wages, to be replenished during productive years and drawn upon during unproductive years.

The proposed form of the economic mechanism foresees the forestalling development of strong, very effective enterprises which produce the greatest return on each ruble of invested resources. But how should we treat weak enterprises which remain debt-ridden for years on end and which extract resources from the government? Evidently they need temporary help, but not from the bottomless government pocket but from RAPO centralized funds, with RAPO cooperation and control. I feel that the practice of curatorship, in which an experienced director temporarily works in a lagging enterprise or replaces the director in two enterprises, with additional wages, deserves attention. This will enable us to change the very approach to lagging kolkhozes and sovkhoses and the psychological climate in them. It is easy to be dependent on the government, but it is much more difficult to be a burden to one's colleagues and partners. A change in status will become the decisive condition for change in this complicated and painful problem.

The transition to a uniform system of economic relations would be, as you can see, a definite step toward the further drawing together and subsequent merging of kolkhoz-cooperative property with common public property, the necessity of which is noted in the draft for the new edition of the CPSU Program.

In connection with the aforementioned, I propose supplementing Section 6 of the draft of the Basic Directions with the following resolution: "To implement the gradual transition of the RAPO to complete and strict cost accounting. To tie the wage fund of management workers and specialists within the RAPO apparatus to the end results of economic operations of the entire association, to establish methods for influencing inefficient kolkhozes and sovkhozes and in particular to establish the nature, schedule and conditions of aid with the goal of increasing their efficiency. To utilize centralized insurance funds more widely in order to mitigate fluctuations in wages during productive and unproductive years."

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AGRO-ECONOMICS AND ORGANIZATION

VASKhNIL ACADEMICIAN ON LITHUANIAN ECONOMIC MANAGEMENT

Moscow IZVESTIYA in Russian 2 Jan 86 p 2

[Interview by V. Gavrichkin, IZVESTIYA correspondent, with B. Poshkusa, Director of the NII [Scientific Research Institute] of Agricultural Economics of the Lithuanian SSR, under the rubric "Science Directs Us": "The Point of Support"]

[Excerpts] Stable growth in agricultural production, dependable supplies of food products and agricultural raw materials within the country, the joining of efforts of all branches of the APK [Agroindustrial complex] to obtain high end results in accordance with the Food Program--this is how the basic tasks of the country's APK have been formulated in the party's pre-congress documents.

In order to carry out these tasks, USSR Gosagroprom [State Agroindustrial Association] must, together with an organizational restructuring, also confirm the new style of interrelations among all links of the complex. The main thing here is the emphasis on economic methods of management. A great deal must be done and has stood the test of practical implementation. It is important to gather all the best from the accumulated experience and to utilize it in work to increase the effectiveness of the APK's resource potential.

[Answer] The result of smoothing out economic management conditions is evident, and I do mean conditions. We have been working on this type of system in the republic for over 20 years. In my opinion we have come up with an economic instrument with very broad potential.

The peasant lives off the land. The land is the mother of treasures. If for example we place a monetary value on land, then land will make up about 60 percent of total resource potential. But fields do differ from each other. We have enterprises whose land is evaluated at only 25 points as compared to an average republic evaluation of 40. There are lands with an evaluation of 68 points. Differences in fertility, as we can see, equal a factor of 2.5. It is clear that we cannot do without a differential approach to management. The productivity of fields and livestock depends on supplies of fixed and

working capital and labor resources, and of course on land quality. These four factors determine production volume. By combining them we arrive at a multi-dimensional integrated evaluation of natural-economic management conditions or in other words, of resource potential.

A multi-dimensional evaluation for each rayon, kolkhoz and sovkhoz essentially means a scientifically-based standard which determines our potential today. If we manage operations at a normal average-republic level then for each point in the multi-dimensional evaluation we must produce the same quantity of products.

[Question] And how much is produced?

[Answer] In monetary terms--about 6 rubles. If throughout the republic the multi-dimensional evaluation is 100 points per hectare, the enterprises with a resource potential of 150 points are obliged to produce products valued at 900 rubles per hectare, and those with an evaluation of only 60 points--products valued at 360 rubles.

[Question] What is the actual situation?

[Answer] The volume of production deviates in one or the other direction by no more than 15 percent. This is the result of knowing how to organize things. Our managers say in jest that these percentage points can be used to calculate the amount of intelligence per point of the multi-dimensional evaluation.

A precise determination of potential has enabled us to divide rayons into four groups and the republic's enterprises--into five. For those which find themselves in inferior conditions price supplements for products have been introduced. Of course, this must be within the limits of their sum total costs throughout the republic. In other words, this will be accomplished at the expense of a corresponding price decrease for enterprises which exist under the best conditions. The measure is completely justified.

[Question] I was told that in Varenskiy Rayon price supplements equal an average of 20-25 percent.

[Answer] This rayon belongs to the fourth group. But there are enterprises in the fifth group for which supplements are even higher. Kolkhozes, sovkhozes and entire rayons which traditionally lagged behind in the past have received the opportunity to increase fixed capital and to renew working capital--in other words to carry out expanded reproduction of social-domestic building.

[Question] Now, Boris Ignovich, let's approach the matter from a different point of view. You recall that during our trip I asked rayon managers what they would change in production structure if they were doing the actual planning.

"Probably nothing," said I. Syudikas, chairman of the rayon executive committee. "I only fear that in some places the area in feed root crops may

be diminished somewhat--these are very labor-intensive crops that are not traditional for the region. But without them you will not get much milk."

"Perhaps I would decrease the area in winter crops just a tad. It is difficult to find the land for them," added A. Brazhenis, deputy chairman of the RAPO [Rayon Agroindustrial Association] council.

That is all. What is there to fear? After all, genuine independence begins with the right to plan production oneself. The resource potential is known. There is land--the natural environment which dictates what to produce. Are we really afraid that everyone will suddenly decrease his plan?

[Answer] This is ruled out. I have already stated that a multi-dimensional evaluation of economic management conditions is the basic norm during planning. It guarantees that a depressed plan has not appeared. When the goal is calculated at the optimum level, the production structure and the selection of crops will be chosen from among those which are most economically advantageous under specific conditions. If something must be changed there is a price for this, as well as other management conditions, which are in our hands.

Of 1,070 enterprises in the republic I cannot name two in which all four indicators reflecting the multi-dimensional evaluation are equal. With planning from below, thousands and tens of thousands of workers will begin thinking about reserves. Moreover, the people know about and are interested in production. How many new possibilities they will find!

We have determined that 80 percent of plans assigned centrally in the republic do not correspond with their actual fulfillment--they are either inflated or depressed. When planning takes place directly in the enterprise the result is just the reverse--80 percent of plans are fulfilled. The national economy needs realistic plans.

That is why I am convinced that in order to give enterprises the opportunity to work with initiative we must begin first and foremost with planning. This is the beginning of all beginnings. Then independence in production organization, in technology and in development of material stimuli will begin to manifest itself. In other words, all other attributes of the planning will follow.

[Question] But after all, your republic now has been given great rights--an experiment on improved APK planning is being carried out. One of its basic ideas is planning from below. But everywhere one asks--in rayons, enterprises--whether plans are introduced from above the answer is the same--yes. This applies not only to production. Even the structure of crops and area as well as productivity are "brought down from above" by various cunning means.

[Answer] Unfortunately, this is so. You know it is not importunate to pencil in everything that is necessary in the field of social obligations and drafts of production-financial plans or other documents. But just try to deviate... A psychological change is not a simple matter. It does not occur painlessly.

In addition to planning from below the second goal of the experiment is to create a single, well-coordinated plan for the APK as a whole. A state procurement plan is not assigned now; only a plan for the delivery of products into the union fund is established.

Capital investments and material-technical resources are also allocated by a single line for the entire APK. The republic itself must determine the most advantageous direction and interbranch proportions. In the future all of this will be directed and in part is already being directed into rayons. Production planning must come from below, from enterprises, as we have said. Here is where a subject dialogue should begin. But it is here that we come across problems.

Since there is no procurement plan the republic has the right to dispose at its own discretion of all products remaining after the fulfillment of the plan of deliveries into the union fund. But this is not the problem. Union ministries have confirmed specific plans for their departments and subdepartmental enterprises--what should be produced by whom in what quantities.

Now, with the creation of Gosagroprom, departmental overlapping will be eliminated. But I feel that its lessons should not be forgotten. Can it be that in Vilnius, let us say, no one knows how much and what quality milk, kefir [fermented goat's milk] and sour cream are needed by the population? They know better than anyone else! There can be no doubt in this. If the situation changed, if products were left on site, then the republic organs could decide what to use and how. There is no point in burdening union subdivisions of USSR Gosagroprom with unnecessary work.

[Question] It turns out that there is a huge distance between the idea and its implementation. But let us say that a thought-out, intensive plan has been developed by an enterprise. Its fulfillment depends not only on it but on its partners too. Remember how unflatteringly Mindaugas Rishkus, chairman of Valkininkay Kolkhoz, expressed himself:

"They [partners] have one concern--to do as little as possible and to get as much as possible from the kolkhoz. Their interest does not yet lie in the enterprise."

Directing the interest of partners toward land, toward kolkhozes and sovkhoses and toward achieving maximal effectiveness from all resources--this is one of today's most urgent tasks. How can it be dealt with?

[Answer] I have no doubt that the reality of fulfilling the plan, guarantees and the entire implementation mechanism lies within the system of economic contracts. Local agroproms must now build interrelations among all links of the APK on this basis.

But the economic contract will become a real economic instrument if it precisely indicates obligations, guarantees the interests of parties and



indicates material and legal responsibilities for adhering to these obligations. Here a great deal has not yet been determined. We must still improve the contract system. We must move persistently in this direction. If we develop it thoroughly, it can to a considerable degree replace administrative methods in both management and planning.

[Question] Some principles for improving management are clear--cost accounting and great independence, especially in production planning on the basis of resource potential, the smoothing out of economic management conditions and the development of economic contractual relations. In your opinion, what general requirements should the APK management system answer?

[Answer] In general we must achieve a coordination of centralization and independence in management, the development of an integrated-open APK management system meeting both territorial as well as branch management requirements. Special attention must be given to questions of specialization. International experience shows that specialization and scientific-technical progress are indivisible.

In the past many directors have endured many problems--an enterprise moves toward narrow specialization and then suddenly the prices change. Losses and an immediate "difficult" product are the result.

Today within the framework of an experiment the republic's Sovmin [Council of Ministers] has been allowed to reexamine procurement prices for some products, without surpassing their total cost, of course. This means that a mechanism has appeared whereby the republic's Gosagroprom can regulate prices. It is important to learn to utilize this mechanism so that any product needed by society and ordered for it will provide enterprises with the necessary profitability. It is also possible to stimulate the production of "difficult" products by means of special-purpose supplies of goods such as fertilizers, technology, mixed feeds and many other items. All of this must be dealt with efficiently on a local level.

It is more difficult to change the system in principle. Economic factors are the "components" that move the entire economic mechanism. They must be taken into account so that they work. We must rely on cost elements and on cost law under conditions of plan management of the enterprise. Here we will have to also deal with questions of improving price formation in the national economy.

In other words, there are many problems. Now I will be repeating myself, but I do want to emphasize this again and again--adjustment of the economic mechanism must also be accomplished locally by new APK organs. I think that this will be one of the functions of the upper link of the administration.

[Question] The factors are well known. All we need is a point of support.

[Answer] With the development of comprehensive-open management of the agroprom all of the strands of management come together in one pair of hands. This is a dependable support point. It secures real possibilities for learning, as written in the draft of the Basic Directions, to manage, plan and finance the development of the APK as a single whole at all levels and to increase the role of agroindustrial associations in managing the economic operations of all links of the complex.

AGRO-ECONOMICS AND ORGANIZATION

IZVESTIYA INTERVIEWS 'KUBAN' DIRECTOR ON PROGRESS OF COMBINE

Moscow IZVESTIYA in Russian 9 Dec 85 p 2

[Interview with M. Lomach by A. Dergachev [Previous interview with Director Lomach (IZVESTIYA, 11 Apr 85 p 2) was published in USSR REPORT: Agriculture, JPRS UAG-85-015, 18 Jun 1985, p 115]]

[Text] We have already discussed the Kuban Agro-Industrial Combine, established in Timashevskiy Rayon, Krasnodar Kray (IZVESTIYA No 101, 1985). We remind readers that this combine not only brings together kolkhozes and sovkhozes, but also all service, procurement and processing enterprises in the rayon. Having a unified plan and implementing a unified economic policy, it was possible for the APK to maximize the efficiency with which it used land, materials and and labor, to preserve and protect output produced and deliver it to customers in best condition. The Kuban Agro-Industrial Combine has been given the right to sell part of its output directly through its own trade network at independently set prices and also to enter the external market, earn foreign exchange and purchase equipment abroad. The Combine has been in existence more than a year. In this interview with an IZVESTIYA correspondent, M. Lomach, general director of the Combine, reflects on the experiences gained and potentials for improving efficiency.

[Question] What is the biggest difficulty your agrocombine has encountered? Or, perhaps, what is the most interesting?

[Answer] What do you think it is?

[Question] One can guess. It does not involve crop production. Peasants know how to plow and plant.

Yes, they don't have to be taught that, although improvements are needed here. However, there is much to teach them about trading, but there is something more basic than trading.

Our combine must not just produce agricultural products, but foodstuffs ready for consumption. In other words, as usual, we sell part of our output to the state at fixed purchase prices, all the remaining we process at our own enterprises and sell through the firm's trade network. The Combine already has large grocery stores in Timashevsk, Krasnodar and on the Black Sea Coast in Novorossiysk and Sochi. As a rule, these stores include a cafe and bakery equipped to bake long rolls out of excellent Kuban flour right before the customers' eyes and to sell them there while they are still hot.

Our biggest store is in Sochi. It has a 500,000 ruble monthly turnover. It also has a cafe, two bakeries, and the Kubanskiy Khutor Restaurant. The firm has proven itself well in Sochi. Recently the Sochi Gorispolkom decided to give us a site in the well known Sochi Trade Galeria, where we will soon open a cafeteria and, on the first floor, a grocery with a turnover of 1 million rubles per month.

[Question] What accounts for this million? What do you sell?

[Answer] It would take a long time to enumerate it. For example, there are 12 types of sausage. There are various kinds of hams, dried and smoked fish, honey, sunflower oil prepared by a Cossack recipe, meat byproducts, produce, pork and beef.

To convince ourselves of the truth of this, we visited combine store in the center of Krasnodar. On the shelves there were many kinds of sausage: "Odessa", "Moscow", "Kuban" and many others, arranged in rows. Prices range from 3 rubles 20 kopecks to 8 rubles 70 kopecks ("Moscow" a smoked cheese high-grade type). There was a line consisting mainly of byproducts liver, tongue, heart, stew meat, hog and cow feet. The prices ranged from 40 kopecks to 2 rubles 50 kopecks. It is interesting how meat is purchased here, usually only in small amounts, a half to a whole kilogram. "Why more," they told us, "there is always meat here, what is more, it is fresher, right from the slaughter house." Also, in addition to potatoes, there were onions, beets, cabbages and apples on the shelves.

I asked M. Lomach:

We know that miracles don't happen, so explain it. There were gastronomes [delicatessens] with small assortments in Krasnodar, Timashevsk and Sochi. Suddenly this assortment. Isn't this simply a new sign "Magazin APK Kuban"?

[Answer] This is an experiment. In our view, its essentials are simple: to maximize the return from each hectare of land. After all it feeds us well. We are also to use, without loss, everything grown. This is the task for everyone involved in agriculture. However, in contrast to others, we have one decisive advantage: the possibility of independently and quickly processing (preserving) the harvest, and, without delay, selling products through our stores.

We are only beginning to increase capacity for processing agricultural products and making the first steps towards creating a trade network. Somethings are not yet bringing results. Nevertheless, we are now obtaining

very many more products from the same amounts of raw materials. For example, we now produce 37 types of products which previously were not produced in Timashevskiy Rayon. To process raw materials we use the newest technology and old Cossack recipes. True, we have run into an unexpected barrier: GOSTs -- it is not so simple to "push them through" for new types of products.

As an example, for a long time in the Kuban tomatoes were prepared in their own juices, using garlic, rather than vinegar, as a preservative. However, it turns out that garlic is not in the standards. Also, eggplant in sunflower oil has a fine aroma and taste. Again, however, there is no standard for it.

We have been visited by many representatives from Gosstandard [State Committee on Standards], from sanitation-epidemiological stations and from other institutions. They test and praise our products but say: "there is nothing like it, that means you can't eat it, but..." Why, it can be asked, helplessly wave one's arms. It is a good product, approve a standard for it. This winter we could have cleared the warehouses and started up a new shop with modern equipment. However, instead of that we had to produce 3-liter containers with kilograms of pickles in vinegar. Who needs them?

[Question] Mikkail Mikhailovich, I would like to ask you how the farms suddenly got so interested in the quality of the products they supply. After all, the kolkhozes and sovkhoses in the Combine still essentially retain their independence. What is prompting them to change their behavior?

[Answer] The need to trade. It is one thing to load up products and to take one's concerns off one's shoulders, but it is quite another to sell them oneself and to deliver them to customers. Only during the solution of this task are farms fully faced with questions of product preservation and quality.

Our APK has an association sales and retail trade service (RTO), to which kolkhozes sell their products at prices set by the APO Council and which have trade discounts. Also, in the heat of the season, kolkhozes sell produce and melons at their stalls, bypassing the RTO. However, in this case, they are obliged to adhere to "firm" rules. For example, watermelons should not be less than 3 kilograms each. Strict quality requirements have been set for other products. The Pamyat Lenina Kolkhoz, which we visited, has a stall at the bazaar in Timashevsk and another in Sochi. The kolkhoz earned 60,000 rubles at the stall in Sochi. For comparison, sales proceeds at our grocery store in Sochi are 500,000 a month.

When I see a market stall right next to a beautiful new store, I think that this is not simply the old and the new, but something fundamentally new -- the path which we should follow in further developing trade in food products. We need large general agroindustrial stores in combination with small cafes and bakeries and other similar shops. Kolkhozes are not capable of this, but combines can, and it is profitable to them.

I stress profitable. We are in a position to force farms to intelligently dispose of their output and, if necessary, sort their fruits and vegetables. Ordinarily, they do not want to do that. Why should they, for example, haul tomatoes 400 kilometers from Timashevskiy to Sochi and sell them for 15-20



kopecks a kilogram, when they can convert them into paste and sell them for almost the same price to a cannery.

It is not profitable for kolkhozes and sovkhoses to make sausages, ham, offals and stew and soup meats. These are excessive concerns, when one takes into account the high purchase prices, which, together with various markups, assure total earnings of more than 3 rubles per kilogram, and this for live weight. The combine sells chilled meat for almost the same price. The same goes for innards, tails, ears and feet -- only the cows' moos go to waste. This is profitable to us.

[Question] I want you to explain. It is certainly profitable for you to now obtain much more products from the same amount of raw materials. How is this done? The new processing plants have not yet been built.

[Answer] True, the new ones have not been built. Therefore, we are rebuilding existing ones. Take, for example, the herbarium, where there is a powerful boiler, sewerage lines, in short, everything needed to easily build a quite modern production operation. We are urgently working on it. Sometimes the designers cannot catch up with the builders! Some of our "production" is unsophisticated. For example, does much have to be organized in order to smoke or dry fish. Such fish sells like hotcakes at stores in Timashevsk, Krasnodar and Sochi.

Of course, the main route is known, sharply increase the yields from each hectare of crop land, fish pond and each unit of area for raising fur bearing animals, poultry, etc. However, we are not pushing for "gross". We are trying to process products from our own raw materials so that nothing goes to waste. Of course, this is much more difficult but it has become easier to solve it. The agrocombine is the fully empowered master of the enterprise. The farmers sometimes have partners, but they are subordinate to various departments.

Here is the result. Although it was a difficult year and we did not gather a large harvest, nevertheless, the APK's profits will not be smaller than last year, when the harvest was more abundant. The weather only influences the size of the harvest, but the quality of the products obtained depends entirely upon us. All the wheat procured was in the strong class, practically every steer fed weighed more than 400 kilograms and all milk was first class.

I recall that the combine is to convert to full financial independence (the state now gives kolkhozes and sovkhoses a few subsidies from its budget). There are other important shifts. This year our financial situation improved: our short-term debt of loans from Gosbank declined by 20 million rubles and our own assets increased by 10 million rubles through kolkhozes and sovkhoses entering the APK.

[Question] Just after the Combine had been set up there was concern about the "division of property" between ministries and departments transferring their enterprises to the agrocombine. Was this difficulty overcome?

[Answer] Unfortunately, no. Extended litigation once again shows that departmentalism is an evil which is very difficult to fight. Here is an example, we "inherited" a huge trucking operation -- 480 vehicles -- from the RSFSR Ministry of Motor Vehicle Transportation. However, after transferring the vehicles to us, the Ministry did not transfer the funds for gasoline and spare parts. We have already received an insidious insult from the Ministry of Motor Vehicle Transportation on the eve of the harvest: motor transportation workers have not received a single engine for their exchange fund from KamAZ [Kama Motor Vehicle Plant]. Practically the entire fleet is paralyzed. That is an example from one ministry. In reality, we have to deal with 13.

The construction situation is not any easier. This summer the USSR Ministry of Industrial Construction agreed with us on the work volume for the new five-year plan: 35 million rubles, including 8 million for next year. Suddenly we learned that the builders had eliminated all our orders from their plans. Based on engineering facilities to be built in one town, between 1986 and 1989, our partners from Yugoslavia are to build us a turnkey confectionary factory, a dairy and three packing plants. Does one need to say that such lack of coordination is impermissible.

[Question] In conclusion, what are the first results of agrocombine work and what are plans for the immediate future?

[Answer] To be brief, we are satisfied with the results. We finally organized the association. There are, of course, many problems, but the main thing is that the Combine is in existence and is operating. We are now completing plan coordination for combine development for 1986, the new five-year plan and up until 2000. It will be brought together in an unprecedentedly unified complex: a raw material base, processing, the development of enterprises for storing, producing and selling final products. It is already clear that the target set for us by the Food Program will be overfulfilled by 27 percent for meat and by 7 percent for milk. Everything doesn't have to be listed here. The figures do not distract from the matter. Everything needed to attain our goals is in our hands.

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## AGRO-ECONOMICS AND ORGANIZATION

### PRODUCTION, TRADE INTEGRATED IN LITHUANIAN SOVKHOZ

Moscow EKONOMICHESKAYA GAZETA in Russian No 44, Oct 85 p 21

[Article by Yu. Velivis, director of the Sovkhoz Druskininkay; Kh. Markov, research assistant of the NIIESKh [Scientific Research Institute of Agricultural Economics], Lithuanian SSR, under "Production-Trade-Service" rubric: "Production and Trade Unified in One System."]

[Text] Officially, the Sovkhoz Druskininkay is called an enterprise. But it is more an agricultural-trade complex, occupied not only in the production of milk, meat, eggs, vegetables and other agricultural commodities, but also in their trade. The principal task of the farm is to guarantee that the health resort-city of Druskininkay has fresh vegetables, milk, meat, and poultry farming products. The Sovkhoz was reorganized into the agricultural-trade enterprise of the LiSSR Ministry of Fruit and Vegetable Industry. It was given additional duties in the purchase of commodities and in trade.

The enterprise has also been given the right to buy up and deliver those products that the farm itself does not produce. For this it enters into contractual relations with other farms. For example, the Sovkhoz Merkinė, the Kolchozes Lishkyava, imeni Tsvirki, Nyamunas, and imeni Tamulyavichyusa of the Varenskiy Rayon, supply potatoes to the shops of the enterprise. Sovkhozes Daugshyagiris of the Prenayskiy Rayon and Luksnenay of the Alitusskiy Rayon deliver apples. There are agreements with farms for the supply of onions and garlic.

By order of the Ministry of Fruit and Vegetable Industry of the Republic, fresh and dried fruits, as well as canned ones, which are delivered from other republics or from beyond the border, are received here. As a constituent component of the enterprise, the trade area has its own storehouses and five specialized shops. The organization of purchasing, transportation, and trading of its own and of delivered products is the responsibility of the enterprise's deputy director for trade.

The sovkhov has 5 hectares of hothouses, and 100 hectares have been dedicated to unsheltered cultivation of vegetables. There are 28 designated vegetable crops produced on the farm: cabbage, cucumbers, carrots, tomatoes, various herbs and spices. Annually, there is a large harvest of vegetables. For instance, we obtain 650 quintals of cabbage per hectare, 514 quintals of carrots per hectare, and 420 quintals of beets per hectare. In the hothouses, 27 kilograms of cucumbers are picked per square meter and 16 to 18 kilograms of tomatoes per square meter.

Since the enterprise cannot count on its own production to meet the health resort's requirements for potatoes, apples, and berries, it purchases them from neighboring farms and also from the personal farms of the inhabitants. The private sector of the agricultural trade enterprise makes up a considerable portion of the production and sale of various commodities to the government. About 400 families reside on the farm's territory. Many of them grow potatoes, tomatoes, cucumbers, onions and garlic on personal plots. Nearly half of the families maintain cows. Practically every home raises hogs and domestic fowl. Only the personal farms grow potatoes for trade and carry out hog breeding. This allows the enterprise to fulfill plans for the supply of potatoes to the city, and also to increase meat resources by purchasing hogs from the local inhabitants. In 1984, for example, the agricultural trade enterprise was obligated to supply the city with 2,000 tons of early potatoes. However, the suppliers fell short and gave the city only 1,700 tons. The missing quantity of potatoes was purchased from the inhabitants. As a result, the plan for the supply of potatoes was successfully fulfilled.

The practice by the inhabitants of growing potatoes on common tracts of land has arisen in our area. (This experience has not yet been widely applied within the republic.) This is explained by the peculiarity of the soil conditions. The farm lands are generally sandy. That is why the local inhabitants more readily grow potatoes for their needs and raise other crops to a much lesser degree. Under the existing circumstances, many families of workers and sovkhos employees--especially families living in urban-type apartments--receive, under contractual agreement, plots on common tracts of land near the collective kitchen-gardens, primarily for the growing of early potatoes. The allotted area planted with potatoes consists of from .25 to .50 hectares per family. Of the 263 hectares of fields in the reserve of private plots, 170 hectares are allotted to potatoes on public tracts of land. As a rule, the inhabitants obtain planting material from their output.

The fields allotted for the inhabitants on common tracts of land are not indistinguishable one from the other--each family knows the boundary of its plot of land. We conduct the preparation of the soil, the application of organic fertilizers, the ploughing, the planting and the inter-row cultivation just as on public fields with the means and machinery of the farm. After this work is done, the additional tending of the plots of potatoes is done under the families' own power. At the final stage, during the gathering of the harvest and its transportation, the farm again renders assistance. For this, harvesting machinery and the necessary means of transportation are utilized.

The inhabitants are interested in collecting the potatoes more quickly and bringing in the major portion not later than July. The farm is meeting the wishes of the population half way, and is helping during the gathering of the harvest and its transportation to the retail outlets. This sort of mutual interest has made for success because fresh potatoes had already appeared in the health resort-city in July. Each family sold the government up to 2 tons of potatoes, and some families sold up to 3 to 5 tons. On the average they receive up to 3,000 rubles for their output of potatoes.

The results of the enterprise's integration of agriculture and trade are seen not only in that the sovkhos has become the supplementary supplier of potatoes,



apples and other kinds of commodities to the city. The most important thing is that these commodities are available in the shops and for other consumers evenly throughout the entire year, and are available in an even wider assortment and in better quality.

Seven hundred families contract with the enterprise. They maintain cows, hogs, and domestic fowl. For this, the necessary stipulations have been set up: the right to use haymaking and pasturable agricultural lands and a coordinated system of bartering concentrated feeds for milk and pork. By agreement, the inhabitants provide about 2,000 hogs--approximately 215 tons--and 328 tons of milk. Last year, the enterprise sold commodities for 7 million rubles.

Many families live in farmstead-type homes in the suburbs of Druskininkay. They are not directly connected with agricultural production; they work in sanatorium-medical establishments, in construction, in forestry, in trade, culture and education. Retired people also live here. More than 300 such families carry out subsidiary farming side by side with their principal occupation under contractual relations with the agricultural-trade enterprise. Many have not only flower-beds, gardens, and kitchen-gardens, but also maintain cattle and poultry. The surplus milk and meat is purchased by the government through the farm. They enjoy all the advantages and privileges in the assignment of pastures, hayfields, bartering standards, and transportation services on an equal footing with the Sovkhoz workers.

What is it that agricultural-trade integration has brought about? The consolidation of the functions of production, purchasing and sale of fruit and vegetable output is assisting in increasing the responsibility of farm managers, specialists, and other workers, not only in the fulfillment of plans for the production of commodities, but also for their sale and delivery to the consumer. The smooth and uniform availability of a wide assortment of fruit, vegetables, and other commodities on the counters of stores throughout the entire year is guaranteed. The loss of produce during harvesting, transportation, and storage on the journey from "field to store" has declined.

The agricultural-trade sovkhoz, remaining within the organization of RAPO, is an independent, department enterprise, and its activities are regulated and directed by the republic Ministry of Fruit and Vegetable Industry. The management of the agricultural-trade enterprise has been able to effectively utilize the reserves of the personal auxiliary farm, including the city-dwelling families, to increase food resources.

In closing, we would like to note that the sovkhoz requires an expansion of agricultural land, especially that employed as cultivated meadows and pasture. This group hopes for practical assistance from the republic's Ministry of Land Reclamation and Water Resources.

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## AGRICULTURAL MACHINERY AND EQUIPMENT

UDC 631.245

### CLOSER TIES URGED BETWEEN ECONOMIC PLANNING, MACHINE BUILDING

Moscow EKONOMIKA SELSKOGO KHOZYAYSTVA in Russian No 12, Dec 85 pp 17-21

[Article by N. Dorofeyeva, candidate of economic sciences, A. Bobyleva, junior scientific worker, and I. Zhukova, statistical economist (VNIESKh [All-Union Scientific Institute of Agricultural Economics]): "Improving Production-Economic Ties Between Agriculture and the Branch of Tractor and Agricultural Machine-Building"]

[Text] At a meeting of the CPSU Central Committee on questions of accelerating scientific-technical progress it was noted that in the final analysis the pace and scale of scientific-technical progress determined the effectiveness of public production, including agriculture. In discovering production reserves, village workers are demonstrating greater demandingness toward technology and its quality and are conducting research on ways to improve production-economic ties between agriculture and the sphere that produces the means of production. This article is devoted to one aspect of this problem.

In recent years there has been a significant increase in the delivery of tractors and agricultural machinery to agriculture, as a result of which the level of mechanization of the branch has increased. The technical outfitting of the branch has improved considerably; labor productivity has grown in kolkhozes and sovkhozes. Nevertheless, despite the significant successes achieved by the branch of tractor and agricultural machine-building, the contemporary level of its development does not always correspond to the needs of agricultural production in terms of quality and quantity of supplied technology, which affects the size of the harvest and the quality of agricultural production, results in a lengthening of the schedule to carry out the work and has other negative consequences.

An analysis of supply levels of agricultural machines and equipment in kolkhozes and sovkhozes shows that in 1980-1982 normative needs were satisfied as regards grain-harvesting and beet-harvesting combines and potato diggers; supplies of reapers, cotton cultivators and flax threshers approach the norm. As for other types of machines and equipment for agriculture, supplies lag behind the norm. For machines such as thinners of sugar beet shoots, harvesters of cotton and unripe cotton balls, rakes, machines for cultivating, harvesting and post-harvest cultivation of vegetable and feed root crops, and

machines for mechanization of work in orchards, berry patches and vineyards, needs are satisfied to less than 50 percent of the norm.

The implementation of the "Machine System for the Overall Mechanization of Agricultural Production in 1981-1990" is lagging behind the planned schedule as regards many types of operations. Outfitting with agricultural equipment is often not carried out in an integrated manner but by single machine.

As regards machines for the cultivation, harvesting and post-harvesting cultivation of vegetable crops and feed root crops, for example, at the present time only 50 percent of the items foreseen by the "Machine System" are being delivered.

Due to their design features, many types of machines and equipment that are being manufactured still require considerable expenditures of manual labor on the part of auxiliary workers. The estimated level of mechanization of potato harvesting is about 95 percent. Nevertheless, at the present time half of the entire harvest is collected by potato diggers and here mechanized labor comprises only an insignificant amount.

The possibilities for improving the qualitative parameters of the technology that is being manufactured are being utilized insufficiently. One of the important qualitative indicators of technology is the degree of standardization of its networks, units and parts. The standardization of designs while increasing the quantity production of units, networks and parts raises the quality and dependability of manufactured goods and decreases the nomenclature of spare parts.

The existing system of organization and planning of experimental design work in the area of agricultural machine-building results in duplication, as a result of which a large number of different models of tractors leave the assembly lines of plants. In some enterprises we may find as many as 18 types of tractors although it is expedient to have only 2-6 types. If we keep in mind that machines and equipment must be manufactured for each tractor and that often these items are not interchangeable with each other we can imagine the great difficulties that arise in agricultural enterprises as concerns acquiring sets of machines, carrying out repairs and servicing of equipment and obtaining spare parts.

There are frequent cases in which technically-unfinished machine models are delivered for serial production, resulting in the necessity to make a large number of design changes during the production process. The nomenclature of spare parts for machines of the same model, but produced during different years, changes considerably, which makes it more difficult to obtain supplies of spare parts, results in the accumulation of unmarketable parts and subassemblies in storehouses and complicates the implementation of repairs.

An analysis of the quality of machines arriving at bases of Goskomselkhoztekhnika [State Committee of the Agricultural Equipment Association] and manufactured by the All-Union Scientific-Research and Planning Institute on the Organization, Economy and Technology of Material-Technical Supply to Agriculture attests to the fact that a significant portion

of these machines is released in a damaged state and delivered in incomplete sets. For example, of all the feed-harvesting combines arriving at bases of Goskomselkhoztekhnika over 30 percent have defects, and over 25 percent consist of incomplete sets. The dependability and maintainability of agricultural equipment are inadequate.

Many of the enumerated shortcomings in the operations of the branch of tractor and agricultural machine-building as regards supplying agriculture with the necessary technology are based on inadequacies in production-economic interrelations between these two branches in the course of the development and creation of machines.

In order to satisfy the demand of agriculture for the necessary technology it is expedient to carry out production planning and design in strict accordance with the "Machine System," which determines the basic requirements for agricultural machinery and equipment and their optimal design parameters and which establishes the schedule for development and introduction of interrelated machines and mechanisms. It is essential to increase the responsibility of the branch of tractor and agricultural machine-building for the implementation of the "Machine System," and to confer on it the nature of a directive. The evaluation of this branch's operations must be based not on the quantity of equipment produced but on the delivery to agriculture of sets of machines in accordance with the developed and confirmed "Machine System." It is essential to make more stringent demands as concerns the inclusion of a particular machine in the "System," to make a careful study of technical-economic indicators for the future machine and of agrotechnical requirements, and to avoid the possibility of minute updating of machines.

The level of organization of scientific-research and planning-design work for the development of new machines and the schedule and quality of design implementation to a large degree determine the quality of agricultural technology and the level of mechanization of operations in agriculture. Nevertheless, in the organization and planning of scientific-research and experimental design work there is an absence of a precise orientation toward the timely implementation of all elements of the "Machine System." Designs of different portions of machine units for intensive technologies, tractors and working machines for them are planned by various institutes and design organizations. The schedules for developing and assimilating these different designs by industry do not coincide.

In the organization and planning of scientific-research and experimental design work the absence of a clear orientation toward the end result leads to frequent updating of machines. For example, the broad ZhVR-10 reaper underwent state testing in 1981 and was put into mass production during the 11th Five-Year Plan, but already there are plans to modernize it for the 12th Five-Year Plan.

With the existing system of material stimulation successive small improvements in the development of new technology are preferable to principally new decisions requiring a high level of training, great manpower expenditures and long-term research. The material stimulation to develop new technology depends first and foremost on the results of the introduction of equipment. It



is much easier to introduce small changes, and bonuses for them are practically guaranteed. Moreover, the existing system for taking stock of the economic effectiveness of new equipment, which affects the size of the bonus, often allows individuals to overstate the economic effectiveness of new elaborations and to receive significant bonuses for small changes. There are often worse stimulating conditions as concerns the development of principally-new technology because incentives in the form of advances used for large-scale elaborations do not exceed 30 percent of total bonuses for the development of the new technology.

A serious reason for a slowdown in the pace of satisfying the needs of agriculture is the low level of material interest among the enterprises of the USSR Ministry of Tractor and Agricultural Machine-Building in regards to restructuring production in accordance with the needs of agriculture and renewing the nomenclature of technology that is being manufactured.

At the present time the fund of material stimulation for enterprises and associations of the USSR Ministry of Tractor and Agricultural Machine-Building is formed from the following deductions: from profits into a bonus fund for workers and employees according to the wage fund; from supplementary profits acquired as a result of selling products with an attached price supplement for bearing the state Seal of Quality; and from decreased net cost (deductions for the development, assimilation and introduction of new technology). The sales volume, net cost and profits are the evaluation indicators of production activity which in the final analysis determine the fund of material stimulation. The plan for these indicators is usually fulfilled and overfulfilled. However, the plan for product sales with a consideration of orders by consumers, which characterizes the goal of the operations of this department, is often not fulfilled. For example, Soyuzmashtekhnokult (All-Union State Association for the Production of Machinery for Industrial Crops) in 1981 fulfilled the plan for product sales by 101.3 percent, for labor productivity--by 101.5 percent, for volume of production in the highest quality category--by 103.6 percent and for profits--by 104.7 percent, but for product sales with a consideration of the orders of consumers--by only 98.5 percent.

Despite the incomplete fulfillment of consumer orders, bonuses are still given to enterprises since the "outer limits of underdeliveries" existing within the branch provides the possibility of bonuses even when the delivery plan is not fulfilled.

To orient the enterprises of agricultural machine-building toward fulfilling the needs of agriculture it is essential to make the level of fulfillment of the delivery plan, with a consideration of the orders of consumers, the main indicator for the evaluation of the results of operations of enterprises and associations.

In order to increase the responsibility of machine-building for the timely and complete equipping of tractors with sets of machines it is expedient to introduce compensation by this department for losses to enterprises due to idleness and incomplete use of tractors resulting from not being provided with machines in an amount equal to the losses incurred upon agricultural

production. It makes sense to establish this type of order when the new tractor, not fully equipped with its set of machines that is essential for normal operations, is sold to agricultural enterprises according to a price that has been reduced in proportion to the degree to which the tractor has been underequipped with its set of machines.

An important aspect of the requirements of agriculture regarding technology involves achieving the necessary quality of equipment.

During the years of the 10th Five-Year Plan the output of products in the highest quality category increased considerably. For example, in Soyuzmashtekhkultur this output increased by a factor of 3.8 and in recent years has equalled about one-third of all commodity production. Growth in the proportion of products in the highest quality category was facilitated by the inclusion of this indicator among those used to develop funds when calculating the volume of the fund for material stimulation and among the basic indicators for providing bonuses to management workers of production associations and enterprises of the Ministry of Tractor and Agricultural Machine-Building.

However, this system tangibly stimulates growth in products in the highest quality category as expressed in cost terms. It is advantageous for enterprises to increase the output of one or several items which are already classified in the highest quality category, leaving other items at an inadequate quality level. For example, in Soyuzmashtekhkultur 19 different items of potato-harvesting technology were manufactured in 1981, including one bearing the state Seal of Quality; the respective figures for machines to cultivate and harvest sugar beets were 12 and 2.

Often it is characteristic of the production associations and enterprises of the USSR Ministry of Tractor and Agricultural Machine-Building that a growth in the proportion of products classified in the highest quality category is accompanied by a curtailment of the number of items bearing the state Seal of Quality. For example, in Soyuzkombaynprom [All-Union Combine Industry Production Association] in 1981 the number of items bearing the state Seal of Quality equalled 27 units and the proportion of products in the highest quality category equalled 14 percent, whereas in 1982 the proportion of products in the highest quality category increased to 15.3 percent while the number of items bearing the state Seal of Quality decreased to 22. In Soyuztraktorodvigatel [All-Union Tractor Motor Production Association] in 1980 57 items bore the state Seal of Quality and the proportion of products placed in the highest quality category comprised 34.4 percent. In 1981 the number of items bearing the Seal of Quality decreased to 50 whereas the proportion of products in the highest quality category increased to 39.3 percent.

In order to improve the quality of agricultural technology it is essential to strengthen stimulation according to indicators for increasing the proportion of machine items with the state Seal of Quality and to decrease the proportion of machines in the second-quality category. We should include the results of introducing the "Comprehensive System of Management of Production Quality" among the basic indicators for providing bonuses to management workers of

production associations and enterprises of the USSR Ministry of Tractor and Agricultural Machine Building.

At the present time despite the fact that plant OTK's [Department of Technical Control] must implement detailed quality control at the different stages of the technological process and of the finished product in general, a large number of damaged items are on the market. For this reason it has become necessary to organize, on a broad scale, quality control by representatives of those who place orders for the purpose of examining technology manufactured by plants. This was reflected in the resolution of the CPSU Central Committee and USSR Council of Ministers, "On Improving Economic Interrelations Between Agriculture and Other Branches of the National Economy." Reception workers of Goskomselkhoztekhnika [State Committee of the Agricultural Equipment Association], for example, have in recent years discovered damages in about 30 percent of grain-harvesting combines and 15-50 percent of potato-harvesting combines which have passed quality control in the manufacturing plant.

The organization of double controls gives rise to additional non-production expenditures. In order to avoid them it is essential to strengthen measures of administrative and material responsibility on the part of directors, engineering-technical workers and plant OTK's as concerns marketing damaged products or products that do not correspond to TU [Technical specifications] and GOST [All-Union State Standard]. We must clearly separate the functions of admission quality control of products on bases of material-technical supply and during production in OTK's, and not duplicate them. Admission quality control of products being delivered to the sales base must be oriented toward an examination of the preservation of technology after shipment. All other qualities must be guaranteed by the manufacturing plant in the form of its technical control service. New brands of machines are evaluated by performance experts only during state testing or after the start of mass production according to indicators of reliability and maintainability. The proposals of these experts on improving maintainability arrive in plants when it is difficult to restructure production and for this reason they are not implemented. This work must be carried out at the stages when test samples are being developed.

The system and technology of repairs developed practically after the beginning of mass operation of machines are adapted to indicators of dependability of the machine which is already in existence. The optimal variant can be achieved only with the comprehensive simultaneous development of machine designs and of systems of technical service and repair. As the experience of the GDR shows, contact between repair workers and machine builders must begin at the stage of development of agrotechnical requirements.

At the present time with the goal of increasing the efficiency of railroad transport about 70 percent of agricultural machines and equipment are shipped to material-technical supply bases in unassembled form, in individual parts and units, which is the basis for the organization of assembly shops, where assembly work is more costly and of lower quality than in manufacturing plants. Technical specifications for the delivery of equipment should be examined and coordinated (by the enterprise placing the order) with USSR Gosagroprom [State Agroindustrial Association] and with ministries that supply

the technology. It is essential to more objectively and comprehensively approach the question of evaluating the economic expediency of shipping technology in unassembled form and of assembling it in material-technical supply bases or at the consumer's site.

These are just some of the questions which, in our opinion, must be dealt with in the process of working through the economic mechanism of the national economic agroindustrial complex.

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## AGRICULTURAL MACHINERY AND EQUIPMENT

UDC 631.145

### EFFECTIVE USE OF AUTOTRANSPORT IN AGRICULTURAL ENTERPRISES

Moscow EKONOMIKA SELSKOGO KHOZYAYSTVA in Russian No 12, Dec 85 pp 21-23

[Article by G. Drozd, docent (Vologda Dairy Institute) and P. Sovetov, director Selkhozavtotrans ATP [Motor transportation enterprise]: "Production Relations in Truck Transportation Services to Agricultural Enterprises"]

[Text] The Food Program specifies large scale measures for transportation services to the agroindustrial complex. This makes it important to improve the efficiency with which motor vehicle transportation is used. The use of motor vehicles depends to a great extent upon the nature of the relations between participants in the transportation process: freight dispatcher, motor transportation enterprise and freight receiver.

The main forms of organizing freight transportation by truck are known: centralized and decentralized. Decentralized haulage has a dominant role both on intrafarm and interfarm routes.

Under decentralized haulage, the freight receivers order the vehicles from transportation enterprises and, on their own, organize freight movement without agreeing upon the sequence with other receivers and without taking into account the work of related motor transportation enterprises. The use of the fleet on lines and the organization of the transportation process depends completely upon clients and not upon motor transportation enterprises. Such a way of organizing motor transportation operations leads to low fleet utilization and to the retaining of sizable numbers of lumpers who are not completely busy during the working day and who have no interest in reducing vehicle idle time during loading and unloading or in work mechanization.

Under centralized haulage, the freight dispatcher sets the sequence and time for delivering freight to each receiver, orders vehicles from motor transportation enterprises and carries out all work involved with the preparation and loading of freight (storage, marking, packaging, loading, tying down and filling out the commercial and transportation forms).

Using their own labor and equipment freight receivers unload vehicles and receive freight. This distribution of obligations gives dispatchers a greater interest in reducing the time spent on these operations. With centralized haulage there is no need for large numbers of lumpers.

Motor transportation enterprises obtain preliminary information on forthcoming use of vehicles. Having information on the type and quantity of freight, delivery routes and handling methods they can compile hourly schedules of vehicle operation which minimize idle time and empty runs and specify the optimal type of transportation equipment. By using these schedules it is possible to strictly account for transportation equipment use and eliminate exaggerated reports of work completion. Thus, dispatchers, receivers and transportation enterprises have an interest in organizing the effective use of the fleet. These interests can be embodied in a three party contract for centralized haulage.

Research in Vologda Oblast has shown that centralized haulage in agriculture is steadily expanding. For a number of years there has been a quite high level of centralized haulage of agricultural equipment, repair parts for the oblast agricultural administration, seed grain and potatoes, ferroconcrete items and concrete by vehicles in the Selkhozavtotrans motor transportation enterprise; while lime and peat-mineral composts are hauled by the Vologdasselkhozkhimiya motor transportation association.

Experience shows that centralized haulage helps: improvements in the transportation process, the elimination of unproductive idle time for vehicles while waiting for loading and unloading, the organization of rhythmic and regular vehicle operations on an hourly schedule, the introduction of loading-unloading operation mechanization, the use of increased capacity vehicles and reductions in haulage costs.

According to data from a selective analysis during 1975-1983, compared to decentralized, when freight was hauled centrally at motor transportation units of obsselkhoztekhnika, the Vologdasselkhozkhimiya [Vologda Agricultural Chemical] Association and the Selkhozavtotrans [Agricultural Motor Transport] Enterprise, the coefficients of fleet time use increased by 19-22 percent, freight capacity by 13-15 percent, and runs by 12-17 percent. Prime costs per 10 ton kilometers declined by 18.8-20 percent (See Table).

Economic Indicators for Centralized and Decentralized Freight Haulage for Agriculture in Vologda Oblast (1975-1983)

	Decentralized			Centralized		
	[1]	[2]	Motor Transportation Unit [3]	[1]	[2]	[3]
Use Coefficient						
Work time	0.64	0.61	0.60	0.86	0.82	0.79
Capacity	0.73	0.71	0.76	0.87	0.84	0.91
Run	0.55	0.51	0.59	0.72	0.63	0.75
Prime cost per 10 ton kilometers	64.1	68.0	62.2	51.6	55.2	49.8

Key:

1. Oblast Selkhoztekhnika
2. Vologdasselkhozkhimiya
3. ATP Selkhozavtotrans

With decentralized haulage freight dispatchers are interested in quickly filling out freight payment documents, obtaining payment, freeing their territories of excess (unsold) freight. This all requires smooth dispatching operations. It is more advantageous to a freight dispatcher to have a smaller number of customers who load larger volumes of products. It is not profitable to the freight dispatcher to organize mechanized loading detachments for small freight volumes. The dispatcher dictates the conditions to the receiver.

Transportation enterprises, having received an order from a freight receiver to haul freight for which the documents have been filled, dispatch properly prepared vehicles to the receiver at a previously agreed upon time. The transport enterprise has an interest in seeing that the client (receiver) make highly efficient use of the vehicles on good road conditions. The driver has a desire to protect the freight, to assure trouble free loading and unloading without above norm delays and thus to obtain good earnings.

It is important to the freight receiver to obtain vehicles from the transportation enterprise and to promptly deliver it at minimal transportation outlays. If the freight is light and small, then the receivers usually bring their own lumpers, or higher them from outside. However, large consignments create the need for loading and unloading equipment. From the perspective of haulage organization, it is advantageous and economically advisable for the receiver that there be loading equipment at the dispatchers or the motor transportation enterprise.

Receivers are not concerned about protecting motor transportation enterprise vehicles or their utilization indicators. The transportation enterprise has practically no independence in organizing the effective use of its fleet.

Under centralized haulage, the dispatcher fills out a freight assignment, orders the vehicles and loads them. The dispatcher has no interest in idle time and demands that the motor transportation enterprise supply the vehicles on schedule. It is important to the dispatcher to deliver the freight as quickly as possible, or it will be considered sold after its reception by the receiver. Therefore the dispatcher has an interest in establishing business cooperation with the motor transportation enterprise, and tries to sign a contract.

The freight dispatcher's interests coincide with those of the motor transportation enterprise, which does not reject the possibility of signing a haulage contract and establishing business cooperation. The schedule for vehicle delivery disciplines the drivers, helps assure operational planning of haulage and improves dispatcher management over vehicle movement on the line. Motor transportation enterprises expedite freight. Having continuous delivery and a rigid schedule, the transportation enterprise tries to assure normal unloading at the destination. However, the receiver cannot always do this. Vehicle idle time thus disrupts haulage schedules.

The receiver has an interest in reducing the idle time of vehicles which have arrived for unloading. To organize continuous unloading the receiver has the right to require that the motor transportation enterprise observe previously agreed upon schedules for vehicles to arrive for unloading.

The freight receivers strive to keep approach roads at the unloading site in good condition. It is advantageous to the individual receiver to have loading and unloading equipment even for comparatively small amounts of freight. The reception and unloading of freight are part of the receivers' obligations. It is important to them to promptly receive freight in good condition. With such organization there is no confusion with filling out shipping documents.

Under centralized haulage, drivers' work is under the constant control of the dispatchers', transportation enterprise and receivers. Its rhythm is determined by the schedule. Drivers know about hauling conditions and can predict their earnings. There is a unity of interests between dispatchers and the transportation enterprise in their striving to promptly deliver freight and create optimal conditions for achieving this goal.

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## AGRICULTURAL MACHINERY AND EQUIPMENT

### MINI-EQUIPMENT FOR PRIVATE PLOT USE DESCRIBED

Moscow SELSKAYA ZHIZN in Russian 31 Dec 85 p 2

[Article by M. Timchenko: "To Mini-Technology--A Wide Road"]

[Text] Doubtlessly many people will come to this exhibit today since it has been set up in an especially convenient and populous place. This is because all of its more than 70 displays (not counting implements and attachments to mini-tractors and motorized devices) were created for the sake of one thing: to maximally ease man's labor and make work more attractive and efficient when he is engaged in personal labor, subsidiary farming, public service, at breeding stations and institutes, as well as on kolkhozes and sovkhozes.

Among them are machines and mechanisms put on the market by our own home industry as well as imported small mechanized devices. Models developed by laborers, collective farm workers, engineers and scientists were presented separately. The creativity of the youngest designers--schoolchildren, members of young technician "Yunyy Tekhnik" societies.

The greatest interest was, of course, aroused by the various motorized devices and the mini-tractors. Let's talk about the remarkably well manufactured MB-1 motorized device. Having limited power (3.7 kilowatts), scale and weight (92 kg), this device from the Leningrad plant "Krasnyy Oktyabr" is, in truth, universal. With various attachments and accessories, this motorized unit is capable of carrying out up to 20 operations: it can cultivate and fertilize the soil, sow vegetables and plant potatoes, harvest various crops and prepare fodder, treat wood pulp and sharpen instruments, haul loads and dig holes. This year the enterprise plans to produce 50,000 motorized devices with a line of implements and attachments.

Little is conceded to universality with the MTZ-05 motorized device made at the Minsk Tractor Plant. As explained, even today one can obtain it easily in Belorussia. and the plant is expanding production up to 5,000 annually. Apparently, wide demand is restricted by its high price--outfitted with implements the motorized device costs more than 3,000 rubles. It is thought that with an expanded scale of production, there must be a significant price decrease.

Production of the motorized "Super 610A," on license from the Italian firm "Goldoni," has heated up at the Kutaisi plant, as has manufacture of the "Krot" MK-2 motorized cultivator made at the Moscow Production Association imeni V. V. Chernyshev, and the M-3 motorized unit produced at the Kharkov Tractor Chassis Plant.

There is no reason to boast when it comes to mini-tractors. With the exception of the so-called AMZhK-8 motorized unit for individual farming and preparation of fodder, which still has not passed comprehensive tests and was designed at the Gomel Agricultural Machine Building Plant, not one small scale tractor was presented of native design. Meanwhile, the need for them is no less than that for motorized units.

In a special section there were small scale motorized units and tractors produced by various firms from Italy, Japan, France, the FRG, as well as by enterprises of Czechoslovakia, Yugoslavia, the GDR, Hungary and other countries. The models shown attest to the striving of designers and manufacturers of mini-machinery to raise their technological level and reduce energy and metal consumption, and to improve the work conditions of the drivers.

Great diversity in the designs of mini-tractors and motorized units is being advanced by inventors and innovators. Wheeled and tracked, equipped with hydraulic systems and power take-off shafts, they differ in appearance and working principle from many units and assemblies. At the same time, on every model what strikes the eye are the bold solutions and the original discoveries. The visitors, for example, spend much time examining the mini-tractors designed by M. F. Lysenko, B. T. Pronkin and Yu. S. Malyutin, O. A. Peterson, V. Ya. Melens, A. I. Larionov, and the motorized units of N. V. Pronin, A. A. Ilin, A. N. Popov and A. V. Makeyev and many others.

"In organizing the exhibit, the USSR state agricultural production organization, Gosagroprom, is striving to enlist in the solution of the most important questions involved in the manufacture of small agricultural machinery not only the industrial ministries and departments, but also independent designers, and to actively support the work of innovators," said the deputy chief of the department for mechanization and electrification of the USSR organization Gosagroprom, N. A. Stolbushkin. "A jury of highly qualified specialists will select the most successful units or assemblies or their components and recommend them for production. I can say that even on my first acquaintance many findings of these expert workers startled me. Various technological solutions can find application, and with improvement, if I may say so, in maxi-machines."

Our readers well know how many difficulties there were with copies, how many varying opinions were cross pollinated when the question was debated: should there be mini-technology? Today life conclusively and irreversibly has decided this. The "Basic Trends" plan calls for significant expansion of production of reliable, economic and small-scale tractors, motorized devices equipped with attachments, and other machinery of improved design for use in collective gardens and personalized plots and on personal subsidiary farms. Consequently, here we speak of how, on a wide scale, to set up the production

of small scale technology which responds to current needs. And, it must be stated, industry more and more is directing its attention to the interests of the people.

There is also the section "Small Mechanization Means for Animal Husbandry and the Production of Fodder." Here pulverizers, hammer mills, root cutters, feed steaming plants, water lifts, individual cow milking devices, poultry cages and incubators are demonstrated. All this equipment, intended for use in domestic cattle and poultry raising, is of minimal weight and requires an insignificant amount of energy, and even the price is quite affordable--from 13 to 150 rubles per model. The enterprises of the Ministry of Machine Building for Animal Husbandry and Fodder Production are ready to produce it in the necessary amounts. Now it is just a matter for the organization of trade.

The area in our country where small mechanisms can be applied is large. Millions of inhabitants of villages and cities, who have their own subsidiary farms, await them. Small-scale machines, mechanisms and the various attachments are vitally needed by many laborers at kolkhozes and sovkhoses who are still engaged in manual labor.

And so, on the country's farms there are up to 90 million hectares of finely contoured, hilly, mountainous and forested lands and other unproductive areas where the use of conventional agricultural technology is either economically unsuitable or simply impossible. Being small scale and having high maneuverability and sufficient power, these self-propelled small mechanized means and implements allow for a major increase in the productivity of labor and its quality.

The matter then is to set up mass production of the different small mechanisms that vary by function and make them available to the public, in every way possible raising their technical level and reliability.

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## TILLING AND CROPPING TECHNOLOGY

UDC 633.1(478.9)

### MSSR GRAIN OUTPUT UNDER INTENSIVE TECHNOLOGY

Kishinev SELSKOYE KHOZYAYSTVO MOLDAVII in Russian No 6 Jun 85 pp 24-25

[Article by V. Morar, chairman, Association for Grain and Industrial Crops, Kolkhoz Council MSSR, and V. Zamulko and V. Shur, chief agronomists of the Association, under the rubric "Intensification of Agriculture: Progress and Problems": "Successes and Setbacks in Grain Production"]

[Text] Recently a great deal of work has been carried on at the kolkhozes and interfarm combines of the republic to stabilize grain production. However, this hardly means that all opportunities to achieve larger harvests of grain crops have been exhausted. In the four years of the 11th Five-Year Plan a significant shortage of grain has been allowed to occur.

However, there are farms at which good results have been achieved. This means that there has been efficient use of land there, that the fundamentals of crop rotation have been put into practice scientifically and that plans for the distribution of not only crops but also varieties according to their biological characteristics have been strictly upheld. Yet on the other hand thoughtlessness in these matters is the basic factor in the grain shortage.

Let us demonstrate this using as an example two groups of farms, those harvesting more than 50 and less than 30 quintals per hectare respectively this past year.

Employing such predecessors as peas and a layer of perennial grasses, 35 percent of the area of Group 1 and 25 percent of Group 2 was planted to wheat, the area in stubble being 25 and 44.5 percent respectively.

Overall in the structure of predecessors of the Kolkhoz Council MSSR system, legumes and a layer of perennial grasses have made up 100,000 hectares or almost 39 percent in recent years. In reality 65,000-68,000 hectares are so used. In the case of the 1985 harvest these abuses were also allowed to occur at the kolkhozes and interfarm associations of Bessarabskiy, Kutuzovskiy and Kagulskiy rayons. In addition there has been a misguided attempt to obtain a second alfalfa crop in the final year of its cycle.



And what is more, at a number of farms alfalfa plantings are left for a fourth year, which leads to a violation of the sequence in crop rotation on fields so used and to a virtually complete death of the grass cover and reduced harvests of both alfalfa and its successor crop--winter wheat.

#### Winter Wheat Harvest By Predecessor (1984), quintals/hectare

Rayon Council of Kolkhozes	Predecessor		
	Legumes	Layer of Per- ennial Grasses	Stubble
Kotovskiy	50.3	49.0	43.2
Drokiyevskiy	47.4	44.0	41.4
Kaushanskiy	42.6	45.0	34.1
Leovskiy	40.0	39.1	31.1
Average for Kolkhoz Council of MSSR	43.8	43.0	39.5

Among the three basic predecessors considered above, the poorest is stubble, following which the harvest is substantially smaller.

Of no small importance in obtaining high yields is high-quality tilling of the soil, especially cultivation in connection with the autumn plowing.

The farms that obtain good harvests of winter crops each year generally combine the gathering of early predecessors, as well as silage maize and sunflower, with simultaneous cultivation of the fields, bringing them to a state of complete readiness for planting in the course of two or three days. Naturally, certain difficulties arise here. However the proper organization of labor and an honest relationship of specialists and machine operators to one another assure constant progress.

Everywhere at these farms the method of soil cultivation without turning is used. After the harvest by means of combines, the fields are disk-harrowed; then, KPG-2.2, KPSH-9 and other subsurface cultivators are used. To improve the quality of separation after subsoil cultivation, BIG-3 spike-tooth harrows, RVK-3.6 assemblies, disk harrows and lug rollers or gear-driven rollers are used. However at many farms of Rezinskiy, Nisporenskiy, Kaushanskiy, Leovskiy, Sorokekiy, Kagulskiy and other rayons the soil is prepared after the maturity of such predecessors in an outmoded way and the most essential thing--moisture--is lost; frequently the fields are plowed from under the peas and substantial means must be expended for their reworking.

Possibilities of new, highly productive regionalized varieties and hybrids of grain crops, which have good long-term prospects, can be achieved more fully through increasing soil fertility and raising the level of agrotechnology on the leading farms.

Within the rayons and farms a skillful combination of Odesskaya 51 and Pitikul made possible a substantial increase in gross yields of wheat. Here the proportion of plantings to highly intensive varieties is around 20 percent.

On the other hand, at the farms that obtained a wheat harvest of less than 30 quintals/hectare, the varieties planted were Pitikul, Obriy and Odesskaya Semidwarf. Semidwarf 49 made up only 7 percent. In this case, preference was shown for one variety. In addition, agrotechnological practice with respect to varieties, especially the biological characteristics of wheat varieties and in particular its requirements as to nutrition, predecessors and other factors in growth and development, was not observed here.

The maize situation is analogous. The yield size of grain crops depends to a certain extent upon a scientifically regulated system for the application of fertilizers and the means of plant protection. The compensation for a kilo of nutrients by an increase in the harvest of winter wheat annually exceeds the index, constituting 6 kg and at many farms 7-8 kg or more of grain.

An average of 253 kg of nutrients were applied to the winter wheat crop in 1984 according to the Kolkhoz Council MSSR. Fertilizer was applied by a three-link system: basic fertilization, fertilization at the time of sowing or a differentiated system, depending on the state of plantings. The main method of feeding is placements of nutrients at a depth, bundled in bushing. An essential role in the achievement of adequate-sized, high-quality yields is played by spreading of crumbled nitrogen fertilizers and their placement in the soil as well as other factors: precipitation and protective measures.

An analysis conducted by specialists shows up the fact that serious violations of the fertilizer application system have been committed on those farms where wheat harvests have been low.

Maize cultivation is also affected by this problem.

The maize hybrids cultivated in the republic achieve their potential only on soil which has been abundantly supplied with nutrients.

Last year the shortage of maize that arose owing simply to the use of unfertilized fields exceeded 14,000 tons altogether. Organic fertilizers are applied to grain crops in extremely small amounts.

For example, 698,000 tons of fertilizer altogether were applied locally to last year's maize seed crop; the fertilized area made up 10,900 hectares. In Bessarabskiy, Kantemirskiy, Komratskiy and Tarakliyskiy rayons fertilizer was applied to 171-100 hectares, but to only 22 hectares in Nisporenskiy Rayon.

Do the specialists know that one ton of local fertilizer adds to the maize yield an amount exceeding 20 kg under the conditions prevailing in our republic?

Poor work with organic means must be regarded as the most serious violation of basic demands made by maize cultivation on industrial technology.

At some farms herbicides and other means of plant protection are used ineffectively. This has led to a reduction of the yield. Because the technology of application and deep placement of fertilizer has been violated in cultivating maize in Kriulyanskiy, Chernenkovskiy and Kotovskiy rayons, their technical efficiency did not exceed 70%; as a result of this the farms had to use additional machinery and human resources to fight weeds.

Work schedules, optimal planting densities, seeds and in particular their quality and other factors also play a considerable role in the achievement of high grain yields.

In our republic both intensive mechanization and the cultivation of crops through programming play a special part in the problem of increasing grain production.

Intensive mechanization has been widely adopted at present in our nation for the cultivation of winter crops. During this year's harvest in the kolkhoz-cooperative sector such crops make up about 70,000 hectares. However, for the realization of the just-mentioned mechanization in full measure, the necessary range of varieties and means of plant protection must be found. Farms of the northern rayons of the republic have no other varieties than Odesskaya 51 for sowing in combination with good predecessors. Yet this variety tends to lodging on rich soils. We recommend only Pitikul varieties for irrigated lands; there are no special barley varieties whatever available.

In the fight against powdery mildew, the fungicides Bayleton, Topsin M, Fundazol and Vitavaks have a positive effect. Nevertheless they are not spread in the required amounts.

For the eradication during growth of field tenny cress, ascus, hedge mustard, thistle, field sowthistle and lesser bindweed 50% Mekoprop is required. It is available in limited quantities.

In recent years many farms have acquired the essentials of programming for maize crops. The maximum harvest reached 166 quintals/hectare. It is well-known that in production conditions, for different reasons, the yield potentials of maize hybrids are only 70-80 percent realized in comparison with those of plots planted to the varieties. We need high-potential hybrids with yields up of 150-180 quintals of grain per hectare. In our nation and

abroad such hybrids are available and yet the maximum crop on irrigated soil on plots in Moldavia planted to varieties was Pioneer 3978 hybrid, yielding 118.4 quintals/hectare over the last three years of experimental cultivation. It is clear that plant breeders must accelerate their work in this direction.

The herbicides now in use on maize--Aleroks, Eradikan, Agelon and others---consume a high volume of energy in use and their application entails loss of moisture, interference with optimal sowing times and deterioration of the soil structure.

Modern production technique is required in the system of herbicides with total activity, especially those designed for use after sowing.

We will close with a word about machines for the application of fertilizer.

The most modern method is local application. However, machines for this method are not available in our republic and the existing centrifugal spreaders do not provide the required evenness of fertilizer distribution.

These, basically, are the resources for increasing the stability and efficiency of grain production.

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## TILLING AND CROPPING TECHNOLOGY

### GRAIN PRODUCTION BY INTENSIVE TECHNOLOGY IN UKSSR DISCUSSED

Moscow SELSKAYA ZHIZN in Russian 4 Sep 85 p 2

[Article by A. Tkachenko, UkSSR Minister of Agriculture: "A New Stage in Crop Production"]

[Text] Wheat, the Ukraine's main grain crop, was grown this year by intensive technology on almost 1.5 million hectares. It is still too early to sum up final results, but the data which we have show that this large scale experiment is opening the road to stable yields of high quality food grains.

What does this specifically involve?

Kolkhozes and sovkhoses in Kremenskiy Rayon, Voroshilovgrad Oblast sent the state 17,000 tons of strong and high grade wheat. The target was 8,500 tons. Intensive technology helped fulfill two sales plans. Using the same wheel tracks for all equipment, farms in Veselinovskiy Rayon, Nikolayev Oblast raised winter wheat on 2,500 hectares, each of which had yield increments of up to 12 additional quintals of select grain. This made it possible to sell the state an additional 3,000 tons.

Each hectare farmed by intensive methods on farms in Kharkov and Kiev oblasts yielded 50-55 quintals of wheat. At the Zorya Komunizmu Kolkhoz in Goshchanskiy Rayon, Rovno Oblast, each hectare farmed intensively produces almost two tons of grain more than an ordinary hectare. Wheat is grown by intensive methods on 102,000 hectares in Cherkassy Oblast. According to preliminary data yields from this area will average 44-45 quintals per hectare. At the Chervoniy Prapor Kolkhoz in Zolotonoshskiy Rayon 55 quintals of wheat were obtained from each of 320 hectares.

Intensive technology was first introduced to the republic back in 1982 in Ivano-Frankovsk Oblast. The Prapor Komunizmu Kolkhoz in Kolomyskiy Rayon was the initiator, as was reported in detail by SELSKAYA ZHIZN. Today one can add that the pioneers have turned out on top. They also have worthy competitors. Last year intensive technology was used on 5,000 hectares by 17 farms in the oblast. Each of them averaged 53.3 quintals of wheat per hectare. For comparison, an average hectare yielded 32.6 quintals. The fields are now bountiful. For example, at the Leninskim Shlyakhom Kolkhoz in Gorodenkovskiy Rayon, 70 quintals were gathered from each hectare.

This list could be continued. However, there is another side to the coin and example of a different situation. One could name many farms and even regions where intensive technology has not given the expected results. Above all, this is because not all farm managers and specialists have mastered the innovation and not all operators have learned the skills. At some farms fertilizers were not applied in the necessary amounts and ratios, while at others they did not observe the deadlines for applying multiple top dressings of nitrogen to plants, depending upon their development phase. In some cases, even though there were wheel tracks on the fields, fertilizers were applied by aircraft. Plants were not really protected from pests and diseases. In Donetsk and Zaporozhye oblasts top dressings at some stages in plant development were not conducted on time. In Crimean, Kirovograd and Kherson oblasts some areas did not receive chemical treatment, while in Sumy and Chernovtsy oblasts practically no insecticides were used.

Both the positive experience and shortcomings in the use of intensive technology were examined in detail at an expanded meeting of our ministry's board. Urgent measures were specified. The sector staff will take operational control over their implementation, assigning its local organs to this. It is intended to give the innovation a "green light" as required by the CPSU Central Committee and USSR Council of Ministers' decree "On Measures to Increase the Production of Winter Grain Crops, Spring Wheat, Corn, Millet and Rice in 1986 Through the Introduction of Intensive Technology."

It has been determined at what farms and regions in the republic such crops will be planted. They will be entrusted to contract detachments and brigades on cost accounting -- the completely empowered masters of the crop rotation. The needed material supplies are being sent there. At all farms, and especially those which use the same wheel tracks for all equipment, agrotechnical charts have been worked out for each crop rotation.

We are now releasing the agronomic service from obligations not inherent to its functions. For example, until recently, during the harvest farms' chief agronomists were shoulder to shoulder with others in leading the harvest-transportation operations and harvest management staffs. Now they are occupied with their direct concerns: programming yields, controlling work on soil preparation and improvement, filling bunkers with seed, selecting varieties and organizing planting.

Preparations for the extensive use of intensive technology in crop production have acquired the most diverse forms. At rayons level kolkhoz chairpersons, sovkhos directors, chief agronomists, chief engineers and other specialists are being certified. At oblast agricultural administrations they are testing the knowledge of such key personnel at the rayon level. These same requirements are being made upon leading specialists at ministry and oblast administrations. Agronomic conferences are being conducted everywhere. At them there are frank discussions of urgent matters: the organization of winter planting, above all using the same wheel tracks for all equipment. At kolkhozes and sovkhoses they are teaching people who will do the autumn planting in a new manner. Machinery deliveries and adjustments are

simultaneously under way. The goal for this work is to see that this autumn intensive technology is used on 4.3 million hectares of winter crops and to obtain 6 million additional tons of grain.

Work is continuing on the creation of agrochemical offices [kabinety] at farms. They are already operating at half of the kolkhozes and sovkhozes in the republic and have been supplied with everything they need. The "Agronomists Working Notebook on Intensive Technology for Growing Winter Wheat, Winter Rye and Winter Rape" has been printed in a mass edition. A similar working notebook is being prepared for spring grain and groat crops.

However, not everything can be foreseen. It is often necessary to quickly solve unexpected agronomic problems. The Ivano-Frankovsk Oblast Administration is conducting express-seminars for specialists prior to performing the various operations on intensively cropped fields. Agricultural administrations at other oblasts in the republic will use this experience.

Because questions in the intensification of grain growing should be solved in close coordination with other problems and become an integral part of scientific crop production, our ministry, jointly with scientific institutions, has prepared working draft plans for growing all agricultural crops in each soil-climatic zone in the republic. These delineate differentiated soil conservation, moisture and energy saving tillage systems, the rational use of fertilizer, chemical land reclamation, plant protection and other measures intended for programmed yields. At the basis of all these measures is the strict observation of scientifically based crop rotations.

Success is to a great extent assured by fertilizing the soil and seed production. In our republic 1 tons of high quality organic fertilizer increases yields by 20-25 kilograms, while 1 ton of fertilizer active ingredients in the required ratio increases yields by 4-5 and, if there are good agronomic conditions by 6-8 centners. It has been resolved that in the next five-year plan applications of organic fertilizer in the forest area [Polesya] will be increased to 15-18 tons per hectare, in the forest-steppe to 10-12 tons and in the steppe to 8 tons. It is planned to obtain this increase in organic fertilizer applications through the more complete use of animal bedding straw, increases in the production of peat-manure composts and expanded green manure crops. Sapropel, poultry manure, sewage water and other additional sources will also be used to improve soil fertility.

The return from mineral fertilizers can be increased if acid soils are neutralized. We have very large areas of acid soils. Up until recently, the chemical treatment of acid soils has been delayed by shortages of liming materials. In order to eliminate these shortages many farms are now working out their own sources. Ternopol Oblast is an example of this. Every rayon here has its own shop for the production of powdered lime. Thanks to this, farms in the oblast have doubled the amount of chemical treatment, increasing it to 600,000 hectares.

Intensive varieties are being used. In particular, in recent years Akhtyrchanka, Kiyanka and other wheat varieties have become widespread. Dneprovskaya-84b, Donetskaya-5 and Obriy are being bred and introduced into

production. Just through the widespread use of intensive varieties the republic annually obtains up to 1 million tons of grain. Unfortunately, many of them are not long-lived. Breeders have still not given us stable varieties such as Bezostaya-1 and Mironovskaya, which, in spite of their solid age, are still in production.

The republic's farmers have serious complaints to make to machinery builders and chemical industry workers. It is necessary to have powerful and mobile grain combines. The Don, which is now being tested, is not suitable everywhere, especially on farms with small fields and hilly terrain. The Niva and Kolos cannot handle yields of 50-60 quintals per hectare, to say nothing of 70. They have large losses. We are studying the possibility of the stationary threshing of high yielding wheat. However, how can this be done? Industry does not produce machinery for this purpose. But we are still seriously thinking about stationary operations.

Intensive technology for the production of high quality food grain is a new stage in agriculture's development. Its extensive production is a test not only for farmers, but for all workers in the agroindustrial complex.

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## TILLING AND CROPPING TECHNOLOGY

### MOLDAVIAN CONFERENCES URGE INTENSIFIED AGRICULTURAL TECHNOLOGY

Kishinev SOVETSKAYA MOLDAVIYA in Russian 30 Jul 85 p 2

[Article attributed to ATEM: "Intensive Technology for Soil Cultivation"]

[Text] Resources for increasing agricultural production to meet the requirements of the April (1985) Plenum of the CPSU Central Committee and of the Party Central Committee's Conference on Questions in the Acceleration of Scientific and Technical Progress were considered at zonal seminar conferences that took place in Suvorovskiy, Orgeyevskiy and Yedinetskiy rayons.

S.K. Grossu, first secretary of the CPMo Central Committee, addressed the participants.

The main speaker was M.I. Snegur, a secretary of the CPMo Central Committee; I.P. Untila and S.K. Arnaut, general directors of the "Selektsiya" and "Gibrid" scientific production associations, who also spoke at the seminar conferences, as well as other scientists and specialists of the agro-industrial complex of the republic, analyzed the situation and measures for further acceleration of scientific and technical progress in soil cultivation.

It was pointed out that in the last 10-12 years sweeping advances had been made in the republic with respect to specialization, concentration and agro-industrial and scientific-production integration, with an increase in the rate at which scientific and technical progress is put into practice. As proposed from the scientific side, that is, the inventory of varieties of agricultural crops has been substantially renewed, mechanized industrial systems for their cultivation have been introduced and efficient forms of organization for labor and wages have been developed.

However, the potential resources for increasing the output of the products of land husbandry are not fully used. As one of the main problems the seminar conferences mentioned the necessity of further improving the structure of sown lands. To solve the problem, which is of vital importance for the republic, of raising the grain yield, winter barley crops must be substantially expanded; indeed, by next year they should make up at least 45 percent of grain crops. Varieties that are optimal for conditions in every zone and provide yields the size of the wheat crop are available. In this connection

the scientists and specialists of the APK must develop technology for large-scale cultivation of this crop; they must review the system of predecessors for it, the tillage of the soil etc. Not less than 700,000 tons of high-quality barley must be produced annually at the farms of the republic.

The raising of pea is an important element of the increase in yields of grain forage crops. The experience of recent years has shown that where this crop is awarded the attention it deserves, it richly rewards the farmer's care. When they have introduced a variety with good prospects, chosen predecessors properly and brought the soil to a high level of fertility, a whole number of kolkhozes and sovkhozes have received 30-35 and more quintals of pea each per hectare. It was emphasized that by carrying on such intensive methods in the branch farmers can already double the production of grain forage crops.

As stated at the seminar conferences, there is a special need to raise the question of how to increase the output of the grain field in connection with the expansion of lands planted to winter barley. By next year all the wheat on an area of 200,000 hectares must be cultivated using intensive mechanization and with cutting of the technological gauge on one fourth of the area. Only strong and valuable grain may be sold to the state. In the discussion of its intensive cultivation, attention was directed to the selection of varieties, of which "Obriy", "Eritrospermum 127" and "Dnestryanka" are the most promising. They provide not only abundant harvests but also a 29-30 percent gluten content in the grain. All the conditions necessary for its propagation exist in the republic.

In Moldavia, it was pointed out, the plantings best suited to retention of moisture, those to pea, which are not eroded by evaporation, can be sown as predecessors to grain. Very important here, however, is a differentiated approach with observance of standards for the sowing of seed according to varietal characteristics and predecessor quality, attention to the composition and quality of crop nutrients and care to protect the crops against disease. In very strict adherence to all the requirements of intensive technology, the seminar-conference participants attributed an important role to the interfarm associations for mechanization. They ought to improve their relationships to partners. It is a question of the scientific production and agroindustrial associations that make up the republic APK.

Maize has a special place in grain production. Industrial technology has been put into operation over the entire area where it is raised. In the six years during which such technology has been employed the addition to the yield compared to the crops grown with conventional technology has amounted to 13.6 quintals per hectare on the average. However, sufficient results have not yet been obtained from the material and technical means devoted to maize. In

the past four years, for example, on every hectare tilled commercially, below 40 quintals of grain is grown on the average. This is caused by lack of accountability on the part of managers and specialists in all links. And as a rule everything begins with poor and badly timed preparation of the soil, with the result that seeds are sown at uneven depths and by the same token the obligatory density of crop plantings is not attained. As other negative factors, mention was made also of faulty application of herbicides leading in its turn to their weakened activity against weeds. These form the source of a significant crop shortfall.

Cultivation of not less than 300,000 hectares of maize using intensive mechanization is planned for next year. It becomes even more important in the replenishment of forage stores for collective animal husbandry in connection with the transfer of this branch to year-round uniform feed. Maize grown for silage, as emphasized, much increases the output of protein per hectare in comparison with grain crops and reduces the energy volume consumed in crop cultivation. Therefore its efficiency must grow through harvest programming, minimization of tillage and coordination of mechanized operations.

To attain the maximum harvest from the maize field this year, we must fertilize plantings at the right time and organize the harvest properly. In terms of silage preparation, for example, we know that managers and specialists of individual farms, without regard to the indisputable advantages of ears of waxy ripeness, continue year after year to harvest the crop in the milky waxy phase, which causes a senseless loss to animal husbandry. The task to be fulfilled consists in making a complete transfer at all farms to preparation of silage with 35-40 percent dry matter in the plants and 50-55 percent ears. Preparation of the required quantity of 5.5 million tons of silage means obtaining an additional 400,000 tons of feed units at an orientation price of over 10 million rubles. This possibility should definitely be made use of this year.

The intensification of production is also crucial in increasing harvests and improving the quality of sunflower, sugar beet, vegetable and other crops. Through the introduction of the achievements of scientific and technical progress the farmers of the republic ought to be aided in achieving in the next years a yield for winter wheat of 50-60 quintals, maize of 70-80 quintals, vegetables of 250-300, sunflower of 25-30, sugar beet of 400-450 and feed of 60-70 quintals of feed units per hectare. Even next year an additional 350,000 tons of grain must be obtained additionally through industrial and intensive mechanization.

Thus, Party raykoms, rayon ispolkoms, ministries and departments received at the seminar conferences the task of creating everywhere conditions of good organization and discipline within cadres, of putting into action all levers of their moral and material incentive and of making into a creative effort

the work of every manager and specialist. It was recommended that the findings of innovators be used more widely and that maximum efficiency be reached through the use of progressive forms in the organization of labor.

The seminar-conference participants learned on site about advanced findings in the organization to be employed for putting the achievements of scientific and technical progress into practice in soil cultivation.

Ye. P. Kalenik, first deputy chairman of the Council of Ministers, USSR, took part in the work of the seminar conferences.

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## TILLING AND CROPPING TECHNOLOGY

### INTERREGIONAL TRANSFER OF AGRICULTURAL AIRCRAFT URGED

Moscow ZASHCHITA RASTENIY in Russian No 8 Aug 85 p 7

[Article by V. N. Pyaskovskiy, department chief, Krasnodar filiate, GosNIIGA [State Scientific Research Institute for Civil Aviation], and V. A. Kharchenko, sector chief: "The Transfer of Aircraft"]

[Text] Agricultural aviation is used unevenly throughout the course of the year in different regions of the country. This is due to the seasonality of agricultural work, characteristics of the climate, agronomic techniques and development phases of various crops. For example, in the Ukraine and in the European part of the RSFSR the greatest intensity of aircraft applications of chemicals is in February, March and April; in Kazakhstan, in June and July; and in Central Asia, in June and September. Consequently, it is possible to transfer a number of aircraft from one agricultural region to another in order to more completely meet agricultural requirements, to perform operations at the optimal agricultural times and to reduce seasonality in the use of aviation equipment.

Through the transfer [manevrirovaniye] of equipment, aviation enterprises in the Ukrainian SSR perform 65 percent of weed eradication work, about 20 percent of defoliation and dessication and 10 percent of pest and disease control work. In the Central and Central Chernozem regions of the RSFSR these figures are 54, 72 and 14 percent respectively. Aircraft assigned from Uzbekistan are used for herbicidal weeding. They do 83 percent of this work on areas serviced by other aviation enterprises.

Aviation equipment is most extensively transferred for cotton defoliation, as this operation takes only 10-15 days, during which it is necessary to work a large area (more than 2 million hectares). The seasonal productivity of aircraft for cotton defoliation is quite high, 2,600-4,000 hectares. If aviation equipment is properly deployed, crews can successfully handle this work volume. As a result, raw cotton losses are reduced by 3-5 percent and fiber quality improved.

It is also effective to transfer aviation equipment to protect grain crops from pests and diseases. In a number of oblasts in the Nonchernozem RSFSR on



an average during intense periods in 1982-1984 assigned aircraft worked 425,600 hectares, resulting in 896,800 rubles of additional output; in the Ukraine the figures were 341,200 hectares and 515,400 rubles.

In order to improve work organization in the transfer of equipment, special staffs have been established. These include representatives of aviation enterprises, agricultural organizations and Selkhoztekhnika.

Staff managers solve methodological questions, control and coordinate aviation chemical application work and assure the continuous and highly productive use of aviation equipment. The staffs give operational assistance in handling aviation and agricultural equipment breakdowns. This way of organizing work helps in more completely using reserves and considerably improves the seasonal productivity of aviation equipment, making it possible to fight pests, diseases and weeds and to conduct defoliation and dessication operations at optimal times and with minimal labor and resource outlays.

In recent years transferred aircraft have been used to treat 18-19 million hectares of crops (apply mineral fertilizer on about 6 million, fight weeds on 9 million, fight pests and diseases on 2 million hectares of crops and defoliate more than 2 million). Thanks to this there is an improvement in the effective work time of aviation equipment, reductions in the seasonality of its use and annual productivity per aircraft has increased 20 and more percent.

To further improve the efficiency of agricultural aviation, the Krasnodar Affiliate has developed the "Temporary Rules on the Transfer of Aircraft for Aviation Work." The testing of these under production conditions in 1985-1986 in Uzbekistan, Kazakhstan, the RSFSR Nonchernozem Zone and the North Caucasus will make it possible to determine the operational and economic advisability of transferring aircraft, flight and service crews for shift work during intensive periods.

The Temporary Rules make provisions for contracts between aviation enterprises in the territories in which the work is being done and the aviation enterprises sending the aircraft and crews. These contracts include: the region of work (autonomous republic, kray, oblast, rayon), the number of aircraft and crews assigned, productivity of flights, work cost, parties' obligations, procedure for receiving and handing over completed work, accounts and responsibility of parties, duration of contracts and other conditions proposed by both parties. Contract duration, work volume, number of aircraft, flight and service crews are altered, depending upon conditions. Fines amounting to 10 percent of the value of uncompleted work are levied for complete or partial violation of a contract.

In the Kazakh SSR a comprehensive plan of organizational-technical measures is being implemented. It includes further increases in requirements with regard to the fulfillment of contractual obligations, improvements in preparations for aviation operations within shortend agrotechnical deadlines.

All these measures will permit the more extensive use of transfers and shift work for crews and will improve seasonal output per aircraft.

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## TILLING AND CROPPING TECHNOLOGY

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### USE OF AGRICULTURAL AVIATION IN RSFSR OUTLINED

Moscow KHIMIYA V SELSKOM KHOZYAYSTVE in Russian No 9 Sep 85 pp 21-23

[Article by G. S. Pavlova, candidate of economics, All-Union Scientific Research and Design-Technological Institute for the Chemicalization of Agriculture: "The Use of Aviation in the Agriculture of the RSFSR"]

[Text] Fertilizer efficiency depends to a great extent upon application times and methods.

Numerous experiments have proven the high efficiency of early spring top dressing of winter grain crops. We are conducting this work on a huge area. in the Russian Federation alone this totals 15-20 million hectares annually.

It is practically impossible for ground based equipment to do such a huge amount of work within agrotechnically optimal times. Here is where agricultural aviation comes to farmers' help.

An insufficiently developed material-technical base for agricultural aviation is delaying further increases in aviation chemical applications. At present only 20 percent of the kolkhozes and sovkhoses in the RSFSR have hard surfaced runways and service areas. It is necessary to build more permanent airports with hard surfaced runways in order to make it possible to apply mineral fertilizers in early spring, that is, within the agrotechnically best times and at other times when weather conditions (rain, unpassable roads, etc) make it impossible to use dirt airfields and ground based equipment.

It should be kept in mind that as the number of runways declines, so do the costs for their construction and maintenance, but costs for the aerial application of chemicals increase because of the increased distance from the runway to the area to be treated.

The criteria for the efficiency of runway construction should be the minimum calculated cost [privedennyye zatraty] for treating 1 hectare of crop land.

The determination of the area serviced by a runway should also take into considerations indicators such as runway construction cost, maintenance outlays, losses of harvests from the area devoted to the runway, costs per flight hour, aircraft capacity, flight speed, etc.

The ratio of ground equipment application to aerial application should be established for each region, based upon local conditions: cropping structure, agronomically optimal times, dispersion of fields, condition of roads and fields, etc. In Leningrad Oblast, for example, it is advisable to aerially apply up to 30 percent of the fertilizers used.

An entire series of constraints should be taken into account when locating runways. In accordance with existing instructions, there should be no aerial applications on parcels which are less than 500 meters wide, or, if helicopters are used, 200 meters wide, those having obstacles or irregular configurations, or crossed by power lines. It is forbidden to apply poisonous chemicals to parcels which are less than 1 kilometer from populated areas, and less than 2 kilometers from fisheries reservoirs.

When locating runways it is mandatory to construct them in a unified layout with warehouses for storing fertilizers and pesticides, personnel facilities, equipment storage areas, approach roads and other necessary facilities.

The economic efficiency of aerial application for various regions in the RSFSR was found in order to determine the sequence of runway construction.

The aerial application of chemicals has a number of advantages over ground equipment: 1. The possibility of conducting operations at agronomically better times; 2. Capabilities in inaccessible mountain regions, flooded plains, etc; 3. The use of aircraft eliminates mechanical damage to plants and compaction of soil; 4. The flexibility of aviation equipment, the possibility of shifting it considerable distances for short periods; 5. Improved labor productivity, the release of workers, improved working conditions; 6. Frees ground equipment and improves the energy-worker ratio. In addition, if flaggers are properly deployed on the area worked, the chemicals can be more evenly applied along the application sweeps.

At the same time, there are definite difficulties in the use of aircraft. These are: restrictions in the use of aircraft due to weather conditions (poor visibility, wind), and local relief (field size and configuration), telephone and power lines.

The main shortcoming of aircraft is higher cost, compared to ground equipment.

When applying small doses of mineral fertilizer (up to 100 kg per hectare) with an AN-2, application costs per hectare are lower than for ground equipment. However, when higher doses are applied, aerial application costs are 1.3-5.0 fold higher than for ground equipment.

The costs of applying pesticides, herbicides and disease control agents in liquid form is lower for an AN-2 than for ground equipment if the recommended and most frequently observed application norms (25-50 liters per hectare) are followed.

The calculated national economic costs for all types of work performed by aircraft are higher than those of ground equipment. However, it should first of all be kept in mind that fertilizer costs are a major share (75-85 percent) of total costs, while only 15-25 percent are for storage, transportation and application. Secondly, and most importantly, aviation operation cost indicators do not completely reflect the economic efficiency of using aircraft in agriculture, as they do not include qualitative indicators.

It is therefore advisable to evaluate the economic efficiency of aviation not by one, but by a set of indicators: 1. Additional increments in yields from the early spring top dressing of grain crops; 2. Net income (per hectare of crop land and ruble of costs) from using aircraft for early spring top dressing of grain crops; 3. Savings in direct labor.

During 1974-1976 comparisons were made of the efficiency of ground and aerial applications of mineral fertilizers and poisonous chemicals in the North Caucasus, the Ukraine, Kazakhstan, and Kurgan and Smolensk oblasts (RSFSR) under equivalent production conditions and in accordance with the approved program and a unified methodology.

These studies established that aerial top dressing in early spring (when it is practically impossible to use ground equipment) increases grain yields in the North Caucasus by 3.3-7.5 quintals per hectare and in the Ukraine by 5.5-5.7. When a 1-RMG-4 spreader was used (at a later date) increments in grain yields were 0.4-2.1 q/ha less.

Root level applications using a SUK-14A grain drill were also less efficient than early spring aerial top dressings of winter crops, which resulted in 2.2-3.9 q/ha yield increments in the North Caucasus and 0.8-1.3 q/ha in the Ukraine.

The main fertilizer applications to all crops are made in the most strained period, when labor and ground equipment are occupied with the harvest and feed preparation, plowing and preparing the soil for planting winter crops, etc. The productivity of the AN-2 when applying fertilizer to plowed land is 3-4 fold higher than that of ground equipment and when top dressing, 5-6 fold higher. Labor costs are reduced 2-2.5 fold. The aerial application of fertilizer to 1 million hectares frees 1,300-1,600 workers and 1,020-1,200 tractors per season.

In plant protection work the efficiency of aerial and ground equipment is about equal. However, the productivity of aviation equipment in applying herbicides and tura [?] increases 9-17 fold, and in orchard and vinyard protection work it increases 25-30 fold. Labor productivity in aerial applications is 3-5 fold higher and additional net income 1.2-1.4 fold greater than when using ground equipment.

In recent years a new plant protection technology has been introduced. This involves small and very small volume sprayers, which use special undiluted factory preparations and which assure even and very fine dispersion of pesticides. Pesticide consumption is reduced by 1.5 fold and more,



transportation costs decline and it is no longer necessary to haul water and prepare mixtures. This is the cheapest and most economical method of plant protection.

The use of highly productive aviation technology to treat crops makes it possible to eliminate pests when they are causing serious damage to crops and spreading to adjacent fields. This reduces the probability of infestation in new areas, the treatment of which would require additional labor and material outlays.

In order to discover the economic efficiency of using agricultural aviation in various zones of the RSFSR, use was made of more than 1,000 field experiments in the early spring top dressing of grain crops conducted by VIYA [Fertilizers and Agricultural Soil Sciences Scientific Research Institute imeni D. N. Pryanishnikov], TsINAO [Central Institute for Agrochemical Services], and VNIPTIKhIM [All-Union Scientific Research and Design-Technological Institute for the Chemicalization of Agriculture].

These experiments were based on data for increments in yields of winter wheat and winter rye on various soil types and subtypes. Then there was a determination of the weighted average increment of winter grain crop yields by RSFSR economic region.

Together with yield increments per unit of active ingredient, there were also calculations of economic effects in terms of net income per hectare and ruble of outlays for aerial applications.

Net income per hectare was equal to the difference between the cost of yield increments (at zonal purchase prices) and outlays for acquiring and using fertilizer and harvesting the additional yields (at norms).

Based on initial information from VIUA, TsINAO and VNIPTIKhIM calculations were made of the average indicators for the efficiency of the early spring top dressing of winter grain crops by economic region of the RSFSR (See Table)

Economic Efficiency of Early Spring Top Dressing of Winter Grain Crops in the RSFSR (Average for 1970-1979, data from VIUA, TsINAO, and VNIPTIKhIM)

Economic Region	Yield Increment (kg of grain per kg of active ingredients)	Net Income (rubles)	
		per hectare	per ruble of outlays
Northwest	9.17	39.8	3.47
Central	10.42	65.4	3.90
Volga-Vyatka	7.32	44.8	3.08
Central Chernozem	10.46	22.3	2.41
Volga	7.94	23.6	2.28
North Caucasus	9.69	26.1	2.87
Urals	10.43	41.7	3.34
West Siberia	6.57	11.9	1.63



The greatest increments in yields from the early spring top dressing of grain crops were obtained at farms in the Central, Central Chernozem, Urals and North Caucasus regions, while the most economically effective were the Central, Northwest and Volga-Vyatka.

The availability of mechanics and machinery operators at kolkhozes and sovkhoses is quite important in determining the requirements for agricultural airfields and the sequence of their construction.

In 1984 the average availability of mechanics and machinery operators at farms in the RSFSR was 86 percent, including 77 percent in the Central Region, 81 percent in the Northwest and 83 percent in Volga-Vyatka.

Thus, in regions of the RSFSR's Nonchernozem Zone, where aviation application work is most effective, there are, as a rule, acute labor shortages. This is yet another argument in favor of expanding the use of aviation in these regions first of all.

The following is necessary to improve the efficiency of agricultural aviation:

Introduce long term programs for aviation chemical operations. These are concluded between Selkhozkhimiya associations and Civil Aviation units. They should include provisions for the use of new technology;

Strengthen Selkhozkhimiya's material-technical base, supporting it with needed machinery for preparing and loading dry and liquid chemicals;

Constantly maintain runways in working order and assure their prompt repair;

Reduce airplane and helicopter idle time due to the fault of agriculture and aviation enterprises.

It is necessary to solve the problem of loading mineral fertilizers in airplanes and helicopters, as the previously used ZUN-1.5 loader is no longer built, and the production of the new model has not yet begun. In order to load aircraft local mechanics must build various devices and attachments. For this purpose some places use loaders based upon self-propelled combines which have been written off farm books, or stationary loaders. PSM-30 Attachments for stackers are also being used.

The economic and technical efficiency of using aircraft to apply fertilizers and chemical agents are equal to that of ground methods, and are higher with regard to a number of indicators (labor productivity, reductions in labor costs, possibilities of application at times of optimal soil moisture, etc. These make it advisable to expand the sphere of agricultural aviation to the most effective types of work, especially top dressing winter crops and plant protection.

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